CONTENTS

TRADE NAME	MODEL	SET AND FOLDER No.
Coronado	RA44-8140A, RA44-8141A	301-2
Crosley	H-21CKBF, CKBU, CKMF, CKMU, HKBF, HKBU, HKMF, HKMU, TKBF, TKBU, TKMF, TKMU (CH. 466, A, 467) Tel. Rec.	301-3
Ekotape	212 Recorder	301-4
Firestone	4-A-141, 4-A-142 (Code 382-5-377)	301-5
General Electric	635, 636, 637	301-6
Motorola	55J1, 55J2 (Ch. HS-454)	301-7
RCA Victor	6-HF-5 (Ch. RC-150)	301-8
RCA Victor	21-D-395, U (Ch. KCS81H, K, RC-1111A & RS-141E) Tel. Rec. Prod. Chg. Bul. 141	301-1
Silvertone	5032 (Ch. 757.80000)	301-9
Stromberg-Carlson	AR-420 (Series 104)	301-10
Trav-ler	517-82, 521-74, 521-79, -80, -81, -R90, -R91, 5210-60, -61 (Ch. 412E4, 412E5, 412G5) Tel. Rec.	301-11
Truetone	D2586A, B, D2587A, B	301-12
Truetone	2D1534A, 2D1536A, 2D2534A Tel. Rec.	301-13
Westinghouse	H-523T4, H-524T4, H-525T4, H-538T4, A, H-539T4, A, H-540T4, A (Ch. V-2239-1, -2)	301-14
Zenith	T2670E, EU, R, RU, (Ch. 19T23) Tel. Rec.	301-15

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 7 IN SET 219		RCA VICTOR MODELS 21-D-395, U (Ch. KCS81H, K, RC-1111A, RS-141E)
	RCA Victor models 21-D-346, U (Ch. KCS81D, E, Radio Ch. RC-1111A, Power Ch. RS-141A) were covered in Photofact Folder 7 — Set 219. Models 21-D-395, U (Ch. KCS81H, K, Radio Ch. RC-1111A, Power Ch. RS-141E) are electrically identical, except different tuners are used.	
Ch. KCS81H	Model 21-D-395 (Ch. KCS81H) incorporates tuner KRK-29. A schematic (Fig. #1) and alignment procedure are given in this bulletin.	
Ch. KCS81K	Model 21-D-395U (Ch. KCS81K) incorporates tuner KRK-12B. A schematic (Fig. #2) and alignment procedure are given in this bulletin.	

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the horizontal oscillator tube (V16).

KRK29 ANTENNA MATCHING UNIT ALIGNMENT

The antenna matching unit has been properly aligned at the factory. The RF unit is aligned with a particular antenna matching unit in place.
If a new antenna unit is installed, the RF unit should be realigned. Alignment should not be attempted without the proper alignment facilities.
The FM trap which is located on the antenna matching unit may be adjusted without affecting the RF alignment.
Break the lead below point (A). Use a short jumper to connect point (A) on the matching unit thru a .001MFD capacitor to pin 1 (grid) of 2nd. Video IF tube. Remove first video IF tube from its socket. Cover of matching unit must be in place during alignment. Connect the ends of a 1000Ω potentiometer across a 7.5 volt battery capable of withstanding considerable current drain. Connect the positive terminal to the chassis and the potentiometer arm to the IF AGC line. Set the potentiometer arm to obtain -5 volts at this point.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	Not used	45.75MC (400∿Mod)	Any	Vert. Amp. to detector load resistor. Low side to chassis.	A1	Set oscilloscope gain to maximum and adjust A1 for MINIMUM 400∿ response on scope.
2.	"	"	"	41.25MC (400∿Mod)	"	"	A2	"
3.	"	"	50MC (20MC Swp)	50MC 52MC 53MC 60MC	"	Vert. Amp. thru detector probe (Fig. 1) to point (A). Low side to chassis.	A3, A4	Remove .001MFD capacitor (see instructions above) from point (A) and connect a 300Ω, ½ watt carbon resistor from point (A) to chassis using short leads. Adjust A3 and A4 to obtain response curve as in Fig. 2. Repeat steps 1, 2 and 3 until no further improvement is made. Remove 300Ω resistor and detector probe. Restore the connection between the FM trap and the channel switch. Replace the first video IF tube in its socket.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

An RF unit which is operative and requires only minor touch-up adjustments will require no pre-setting of adjustments. Where complete alignment is necessary make the following pre-adjustments:

1. Preset A12 all the way out.
2. Set channel 7 to 13 oscillator slugs one turn from tight.
3. Adjust A9 so that the slug is all the way out.

Disconnect the link from terminals "A" and "B" of the first video IF coil and terminate the link with a 39Ω carbon resistor.
Connect the potentiometer arm of the bias supply to the AGC terminal on the tuner. Connect the positive lead to the tuner chassis. Adjust the bias supply to produce -3 volts at AGC terminal of tuner.
(Temporarily disconnect bias supply until step 10 has been completed.)
Tuner alignment as outlined below requires the use of a heterodyne frequency meter.
The limits for oscillator injection voltage are 2 volts minimum and 5.5 volts maximum measured at point Ⓓ with a VTVM.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Direct	High side to point Ⓐ. Low side to chassis.	Not used	43.5MC	2	Vert. Amp. to point Ⓓ. Low side to chassis.	A13	To be sure that 43.5MC trap is adjusted with zero bias short tuner AGC terminal to ground. Set scope gain to maximum. Adjust signal generator for maximum output. Adjust A13 for MINIMUM 400∿ indication on scope. Remove AGC jumper to ground and reconnect bias to AGC terminal.
11.		RF input of heterodyne frequency meter to end of insulated wire inserted in hole provided for adjustment of A17.	"	Set freq. meter to 227MC	8	Not used	A15, A12	Preset A14 for -3 volts on VTVM at point Ⓓ. Turn fine tuning control maximum clockwise. Adjust A15 for audible beat on freq. meter. Adjust A12 clockwise until beat note just begins to change, then turn one full turn in same clockwise direction. Return fine tuning control to its mid-range position.
	NOTE: If channel 8 oscillator frequency cannot be reached by adjustment of A15 switch to channel 13 and adjust A16 for channel 13 oscillator frequency, then switch to channel 12 and adjust A18 for channel 12 oscillator frequency. Continue down to channel 8 and adjusting proper oscillator trimmer to obtain proper oscillator frequency on each channel. Also, on channel 8, adjust A15 for channel 8 oscillator frequency. Switch to channel 13 and adjust A16, then switch back to channel 8 and adjust A15 again.							
12.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	183MC (10MC Swp)	181.25MC 185.75MC	8	Vert. Amp. to point Ⓓ. Low side to chassis.	A29, A17, A30, A31	Set A9 to maximum counter clockwise rotation. Set scope gain to maximum and attenuate signal generator for minimum input signal which will produce usable pattern on scope. Adjust A29, A17, A30 and A31 for response similar to Fig. 5. Adjust A31 for maximum amplitude between markers. A30 affects the pass band. A29 affects the tilt. A17 affects the response band width.
13.	Connect the DC probe of VTVM to point Ⓓ. Common to chassis. Adjust A14 for -3 volts at point Ⓓ. Repeat step 12 until proper response is obtained.							
14.		Connect freq. meter as in step 11.	Not used	Freq. meter to 257MC	13	Not used	A16	Turn fine tuning control maximum clockwise. Adjust A16 for audible beat on freq. meter. SLIGHTLY overshoot the adjustment an additional turn in the same direction, then adjust A12 to again obtain an audible beat
15.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	"	Vert. Amp. to point Ⓓ. Low side to chassis.	A32, A33	Adjust for response similar to Fig. 5. Turn off generator and check oscillator injection voltage at point Ⓓ using VTVM as in step 13. If A14 required readjustment turn sweep generator back and recheck channel 13 response. If necessary, retouch A32 and A33 to obtain desired response.
16.		Connect freq. meter as in step 11.	Not used	Freq. meter to 227MC	8	Not used	A12	Check for audible beat on freq. meter. If necessary, adjust A12 for proper oscillator frequency.
17.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω each lead.	183MC (10MC Swp)	181.25MC 185.75MC	"	Vert. Amp. to point Ⓓ. Low side to chassis.	A29, A17, A30, A31	If necessary, retouch A29, A17, A30 and A31 to obtain response similar to Fig. 5. If A29 required adjustment turn off generator and switch back to channel 13 and check oscillator injection voltage as in step 15. If necessary repeat steps 15, 16 and 17.
18.		Connect freq. meter as in step 11.	Not used	Freq. meter to 129MC	6	Not used	A24	Set fine tuning control to its mid-range position. Adjust A24 for audible beat on frequency meter.
19.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	85MC (10MC Swp)	83.25MC 87.75MC	"	Vert. Amp. to point Ⓓ. Low side to chassis.	A34, A35	Check for response curve similr to Fig. 5. Check oscillator injection voltage as in step 15. Readjust A14 if necessary.
20.	If A14 required adjustment switch receiver and generator to channel 8. Retouch A29 for response similar to Fig. 5. Recheck A12 and A15 for proper oscillator frequency as in step 11.							
21.	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	85MC (10MC Swp)	83.25MC 87.75MC	6	Vert. Amp. to point Ⓓ. Low side to chassis.		Check for response similar to Fig. 5. Check oscillator injection voltage for each channel at point Ⓓ. Marker response should not fall below 80% on any channel. If markers fall below 80% on response curve, retouch A34 and A35 to obtain proper response.
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			
22.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to Fig. 5. Check oscillator injection voltage for each channel at point Ⓓ. If markers fall below 80% on any channel, retouch A17, A29 and A30 for proper response.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			

PROPERTY OF
L. F. BLANKENSHIP.
3924 MEADE ST.
DENVER, COLORADO

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
23		Connect freq. meter as in step 11.	Not used	Freq. meter to 257MC	13	Not used	A16	Adjust individual channel oscillator slug for audible beat on each channel. Recheck oscillator injection voltage on each channel at point Ⓓ to verify that the voltage is within the limits (2 volts maximum and 5.5 volts minimum).
				251MC	12		A18	
				245MC	11		A19	
				239MC	10		A20	
				233MC	9		A21	
				227MC	8		A22	
				221MC	7		A23	
				129MC	6		A24	
				123MC	5		A25	
				113MC	4		A26	
				107MC	3		A27	
				101MC	2		A28	

KRK12B VHF TUNER ALIGNMENT

It is necessary to meter the non-oscillating plate current of the 6S4 voltage control tube. This can be accomplished by use of an adapter or similar arrangement. The circuit diagram for the adapter is shown in Fig. 6. Remove the 6S4 from its socket and insert the adapter plug. Plug the 6S4 into the adapter.
Connect a 0-50 milliameter to adapter and turn the switch on.
Remove the tuner cover shield.
Set channel selector switch midway between channels to disable local oscillator. Some tubes may oscillate even with the tuned circuits disengaged. As a check short circuit the spring contacts 12 and 13 nearest the tuner front, with a finger (contacts are at zero DC potential). If plate current rises keep finger on contacts while adjusting the oscillator voltage control for 28MA indication on the mter. Replace tuner cover.
The oscilloscope used should have a sensitivity of 1 milvolt per inch. If sensitivity is less a suitable preamplifier may be used with the scope.
A heterodyne frequency meter is used while making VHF oscillator adjustments.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
24	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	57MC (20MC Swp)	55.25MC 59.75MC	2	Vert. Amp. to point Ⓗ. Low side to chassis.	A13, A14, A15, A16	Ground the AGC line at the tuner terminal board. Turn off adapter switch removing plate voltage from oscillator. Adjust for response similar to Fig. 7B. Do no exceed limits shown in Fig. 7A and Fig. 7C. Each channel strip adjustment for an individual channel strip has a corresponding adjustment on all other VHF channel strips. Since these adjustments are identical in position and function they are indicated by the same "A" number in the interests of simplification. Adjustments A13, A14, and A15 are accessible thru holes in top of tuner as the channel switch is turned to each channel. Adjustment A16 refers to coupling capacitor whose positioning affects bandwidth of response curve.
			63MC (20MC Swp)	61.25MC 65.75MC	3			
			69MC (20MC Swp)	67.25MC 71.75MC	4			
			79MC (20MC Swp)	77.25MC 81.75MC	5			
			85MC (20MC Swp)	83.25MC 87.75MC	6			
			177MC (20MC Swp)	175.25MC 179.75MC	7			
			183MC (20MC Swp)	181.25MC 185.75MC	8			
			189MC (20MC Swp)	187.25MC 191.75MC	9			
			195MC (20MC Swp)	193.25MC 197.75MC	10			
			201MC (20MC Swp)	199.25MC 203.75MC	11			
			207MC (20MC Swp)	205.25MC 209.75MC	12			
			213MC (20MC Swp)	211.25MC 215.75MC	13			

25. Turn off the sweep generator and remove the scope from point Ⓗ. Turn the AGC control fully clockwise. Remove the ground placed on the AGC line in the above step. Connect the potentiometer arm of the bias supply to the tuner AGC terminal. Connect the positive lead to the tuner case. Adjust for -3.5 volts at AGC terminal. Connect the potentiometer arm of a second bias supply to IF AGC line. Connect the positive lead to chassis. Adjust for -5 volts at IF AGC line. Turn on the 6S4 adapter switch to apply plate voltage to the oscillator. Connection of the heterodyne frequency meter for oscillator adjustment is made as follows:
Insert the end of an insulated piece of wire into either of two holes next to the oscillator tube at the right front top corner of the tuner. Use care so that wire does not touch any tuned circuits. Connect the other end of wire to RF input of frequency meter.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
26		Connect freq. meter as in step 25.	Not used	Feq. meter to 275MC	13	Not used	A17	Set fine tuning control to its mid-range position. Adjust for audible beat on freq. meter.
27	Two 130Ω Carbon Resistors	Across antenna terminals with 130Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	"	Vert. Amp. to detector load resistor. Low side to chassis. (Use 3 to 5 volts peak to peak output on scope).	A12, A15	Adjust A12 for maximum gain on scope. Adjust A15 for maximum gain and flat-topped curve. Recheck A12 for maximum gain at center of band.
28		Connect as freq. meter as in step 25.	Not used	Feq. meter to 251MC	12	Not used	A17, A15	Adjust A17 on each channel for a audible beat. Connect sweep generator and scope as in step 27. Set sweep and marker to proper frequencies (see chart) for each channel and adjust A15 if necessary for maximum gain and proper response curve.
				245MC	11			
				239MC	10			
				233MC	9			
				227MC	8			
				221MC	7			
				129MC	6			
				123MC	5			
				113MC	4			
				107MC	3			
				101MC	2			
29	Direct	High side to point J Low side to chassis.	Not used	43.5MC (400% Mod)	Any	Vert. Amp. to detector load resistor.	A18	Adjust for MINIMUM 400% indication on scope.

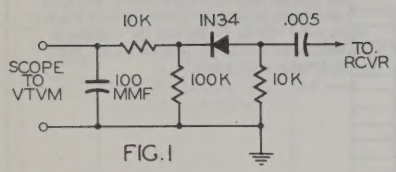


FIG.1

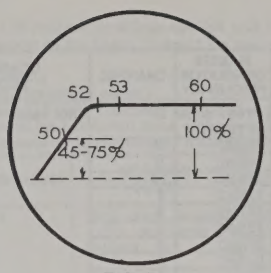


FIG.2

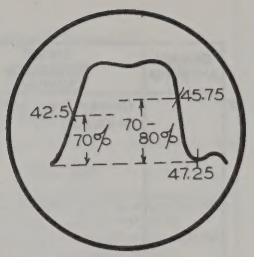


FIG. 3

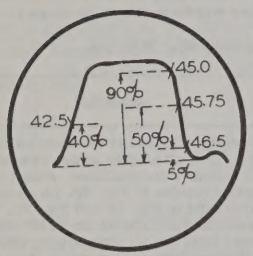


FIG.4

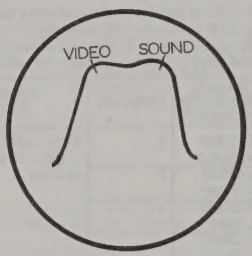


FIG.5

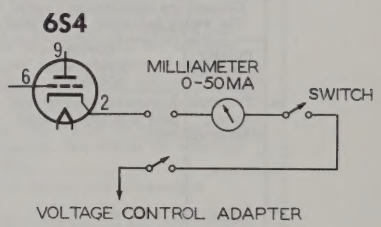


FIG. 6

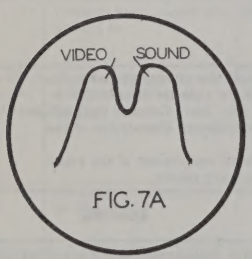


FIG. 7A

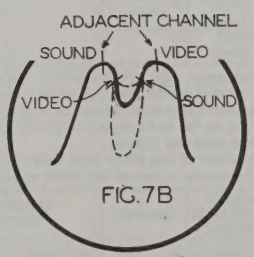


FIG. 7B

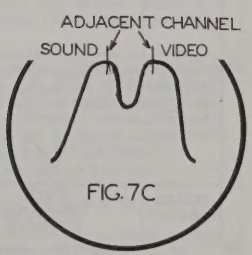


FIG. 7C

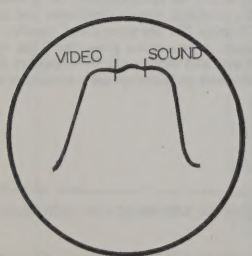


FIG. 8

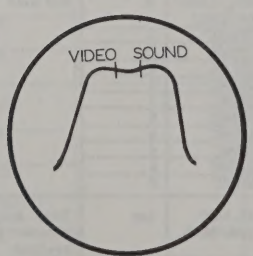


FIG. 8

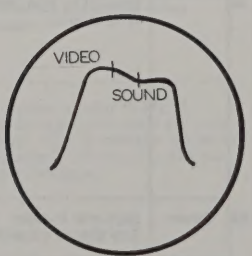


FIG. 8

Alignment of the UHF portion of the tuner should not be attempted unless the following test equipment is available, in addition to the usual VHF test equipment.

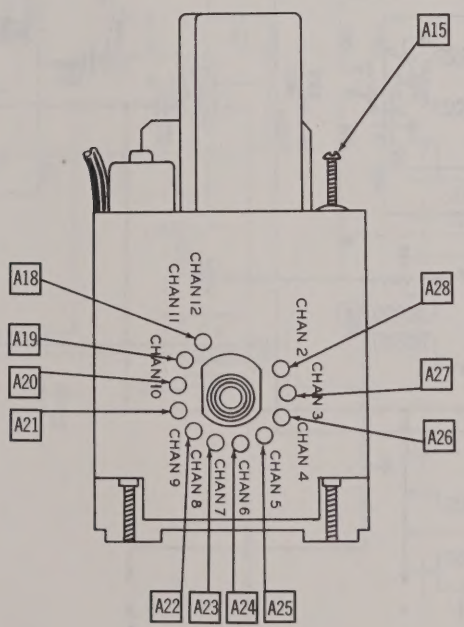
(a) UHF sweep generator covering the frequency range of 470MC to 890MC.
(b) Marker generator of crystal accuracy covering the same frequency range.

Leave the 6S4 adapter connected as under KRK12B VHF tuner alignment.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
30.	10DB Attenuator Pad	Sweep generator thru attenuator to antenna terminals. Connect UHF marker generator loosely to antenna terminals.	Set sweep to cover channel being aligned (see chart). Use 20MC Swp width.	Set to video and sound frequency of channel being aligned (see chart).	14 thru 83	Vert. Amp. to point Ⓗ. Low side to chassis.	A14, A15, A19	Turn off the adapter switch removing plate voltage from the oscillator. Ground the AGC line at the tuner terminal board. Adjust for maximum gain and symmetrical response curve centered about the passband. Set Fig. 8 for acceptable variations.
31.	Connect both bias supplies and adjust as in step 25. Remove the ground from the AGC line. Turn the adapter switch on to apply plate voltage to the oscillator. Connect the VHF signal generator to point H using very short leads. Set generator to 45.75MC for remainder of tuner alignment.							
32.	10DB Attenuator Pad	Sweep generator thru attenuator to antenna terminals. Connect UHF marker generator loosely to antenna terminals.	Set sweep to channel being aligned (see chart). Use 20MC Swp).	Set to video carrier frequency of channel being aligned (See chart).	14 thru 83	Vert. Amp. to detector load resistor. Low side to chassis. (Use 3 to 5 volts peak to peak output on scope).	A17	Adjust A17 for channel strip being aligned until 45.75MC marker and video carrier marker coincide on response curve. Adjust A19 of channel strip being aligned for maximum gain with proper waveshape. Connect VTVM to point H. Common to chassis. Set oscillator injection adjustment for reading on VTVM of .1 volt. Check all channels. Adjust oscillator injection voltage control only if VTVM reads more than .3 volts.

TELEVISION CHANNEL FREQUENCIES

Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier	Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier	Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier	Channel No.	Frequency Band (Mc)	Video Carrier	Sound Carrier
2	54-60	55.25	59.75	23	524-530	525.25	529.75	44	650-656	651.25	655.75	64	770-776	771.25	775.75
3	60-66	61.25	65.75	24	530-536	531.25	535.75	45	656-662	657.25	661.75	65	776-782	777.25	781.75
4	66-72	67.25	71.75	25	536-542	537.25	541.75	46	662-668	663.25	667.75	66	782-788	783.25	787.75
5	76-82	77.25	81.75	26	542-548	543.25	547.75	47	668-674	669.25	673.75	67	788-794	789.25	793.75
6	82-88	83.25	87.75	27	548-554	549.25	553.75	48	674-680	675.25	679.75	68	794-800	795.25	799.75
7	174-180	175.25	179.75	28	554-560	555.25	559.75	49	680-686	681.25	685.75	69	800-806	801.25	805.75
8	180-186	181.25	185.75	29	560-566	561.25	565.75	50	686-692	687.25	691.75	70	806-812	807.25	811.75
9	186-192	187.25	191.75	30	566-572	567.25	571.75	51	692-698	693.25	697.75	71	812-818	813.25	817.75
10	192-198	193.25	197.75	31	572-578	573.25	577.75	52	698-704	699.25	703.75	72	818-824	819.25	823.75
11	198-204	199.25	203.75	32	578-584	579.25	583.75	53	704-710	705.25	709.75	73	824-830	825.25	829.75
12	204-210	205.25	209.75	33	584-590	585.25	589.75	54	710-716	711.25	715.75	74	830-836	831.25	835.75
13	210-216	211.25	215.75	34	590-596	591.25	595.75	55	716-722	717.25	721.75	75	836-842	837.25	841.75
14	470-476	471.25	475.75	35	596-602	597.25	601.75	56	722-728	723.25	727.75	76	842-848	843.25	847.75
15	476-482	477.25	481.75	36	602-608	603.25	607.75	57	728-734	729.25	733.75	77	848-854	849.25	853.75
16	482-488	483.25	487.75	37	608-614	609.25	613.75	58	734-740	735.25	739.75	78	854-860	855.25	859.75
17	488-494	489.25	493.75	38	614-620	615.25	619.75	59	740-746	741.25	745.75	79	860-866	861.25	865.75
18	494-500	495.25	499.75	39	620-626	621.25	625.75	60	746-752	747.25	751.75	80	866-872	867.25	871.75
19	500-506	501.25	505.75	40	626-632	627.25	631.75	61	752-758	753.25	757.75	81	872-878	873.25	877.75
20	506-512	507.25	511.75	41	632-638	633.25	637.75	62	758-764	759.25	763.75	82	878-884	879.25	883.75
21	512-518	513.25	517.75	42	638-644	639.25	643.75	63	764-770	765.25	769.75	83	884-890	885.25	889.75
22	518-524	519.25	523.75	43	644-650	645.25	649.75								



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

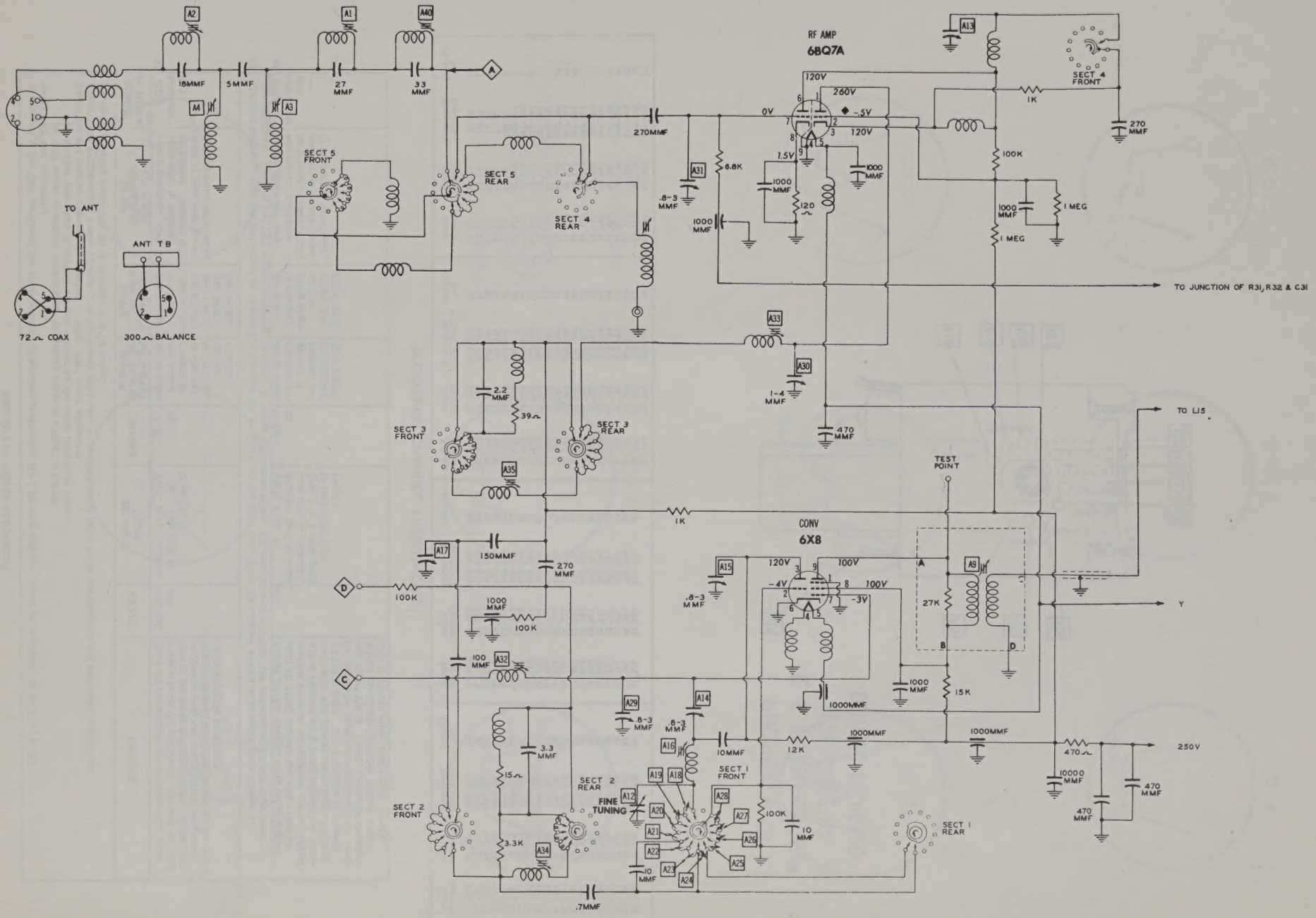

RF AMP
6BQ7A
CONV
6X8
TO ANT
72Ω COAX
ANT TB
300Ω BALANCE
SECT 5 FRONT
SECT 5 REAR
SECT 4 REAR
SECT 4 FRONT
SECT 3 FRONT
SECT 3 REAR
SECT 2 FRONT
SECT 2 REAR
SECT 1 FRONT
SECT 1 REAR
FINE TUNING
TEST POINT
TO JUNCTION OF R31, R32 & C31
TO L15
Y
250V
18MMF
5MMF
27 MMF
33 MMF
270MMF
6.8K
1000 MMF
120
1 MEG
100K
1K
270 MMF
2.2 MMF
39Ω
1-4 MMF
470 MMF
150MMF
100 MMF
.8-3 MMF
3.3 MMF
15Ω
3.3K
10 MMF
.7MMF
12K
27K
15K
10000 MMF
.7MMF

FIGURE 1

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

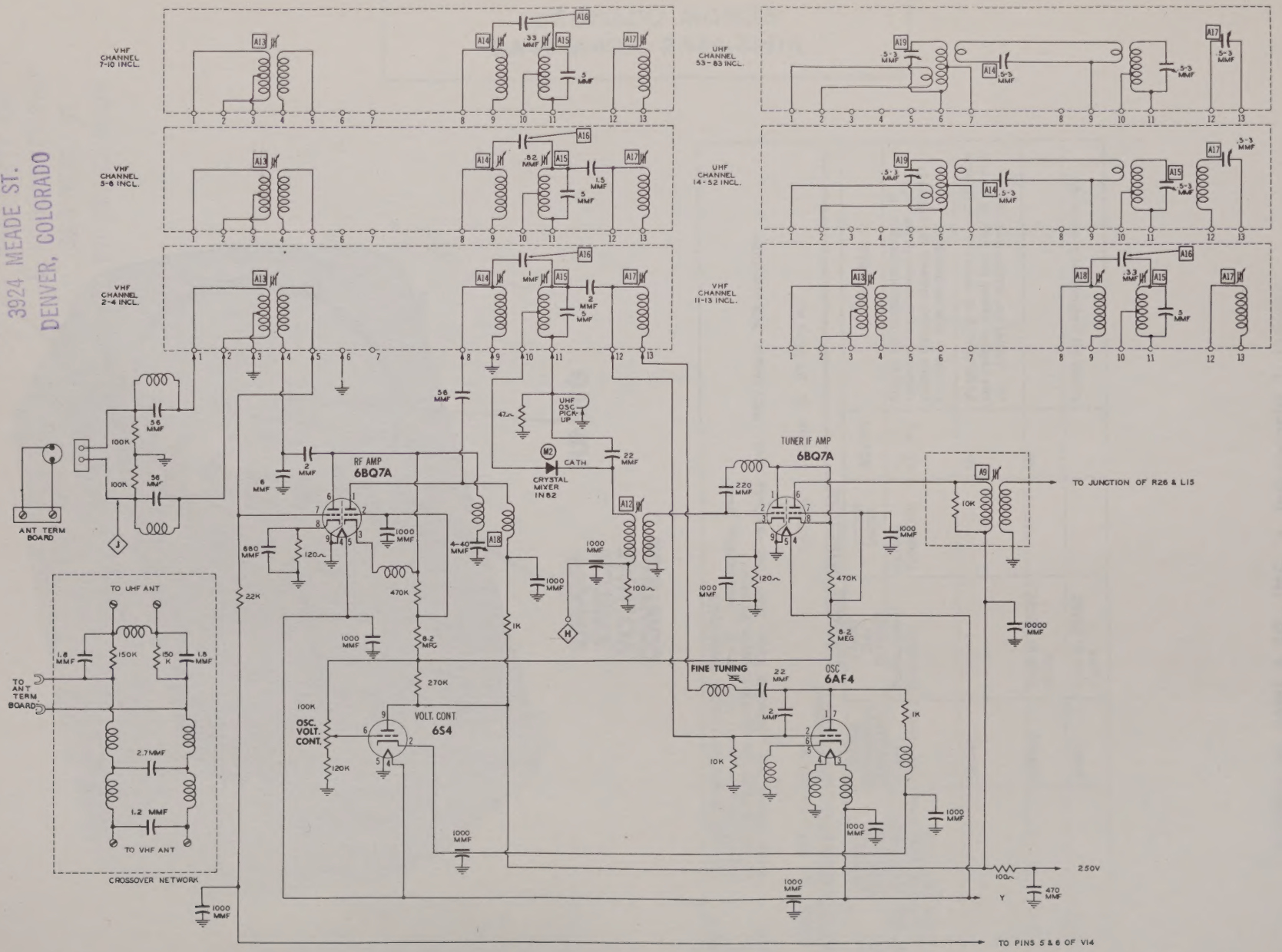
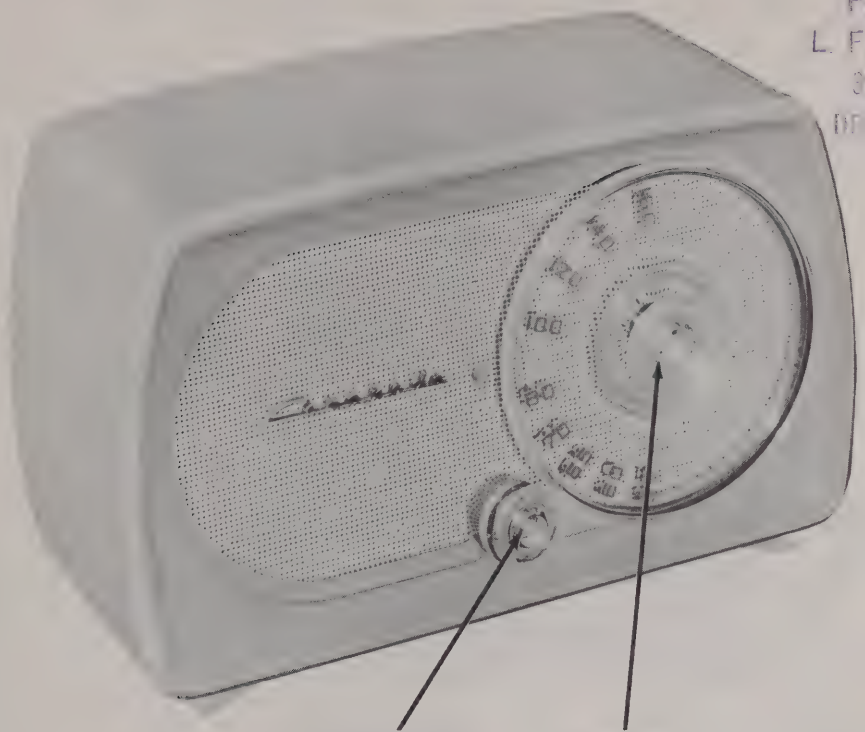


FIGURE 2

PROPERTY OF
L. F. BLANKENSHIP
3024 WADE ST.
DENVER, COLORADO

CORONADO MODELS
RA44-8140A, RA44-8141A



CORONADO MODELS
RA44-8140A, RA44-8141A

TRADE NAME	Coronado Models RA44-8140A, RA44-8141A
SUPPLIER	Gamble-Skogmo, Inc., 15 N. 8th. St., Minneapolis, Minn.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types: 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-DC — RATING .25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400∿ Mod.)	Tuning gang fully open.	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1650KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A6	
4.		"	600KC	Tune to 600KC signal	"		Check for calibration & tracking.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

CORONADO
Model RA44-8140A

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: CORONADO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amp.	12BA6	12BA6	7BK	
V3	Det.-AVC-AF Amp.	12AV6	12AV6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rect.	35W4	35W4	5BQ	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: CORONADO PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1A	■50	150	40736	FP310	TM-3011	T-295	
B	▲30	150					
C	20	25					

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: CORONADO PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	NOTES
C2	.047	200		DF-503		PT4147	
C3	1000		23078	DD-102	801-001	DC521	
C4	100	500		TCZ-100	NPO-337-101	MC235	
C5	10000		22295	DD-103	811-01	DC511	
C6A	5000		♦25264	♦PC-70	♦1406-01		
B	250						
C							
C7	.022	200		DF-203	817-02	PT4122	
C8	.047	400		DF-503		PT4147	
C9	.047	400		DF-503		PT4147	

♦ Items C6A, C6B, C6C, R7A, and R7B are combined in one unit. When replacing items separately, C6B and C6C should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CORONADO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	500KΩ	½	42005					Volume & Switch

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: CORONADO PART No.	IRC PART No.	NOTES
R2	22K	½		BTS-22K	
R3	68K	½		BTS-68K	
R4	2.2Meg	½		BTS-2.2Meg	
R5	68Ω	½		BTS-68	
R6	10Meg	½		BTS-10Meg	

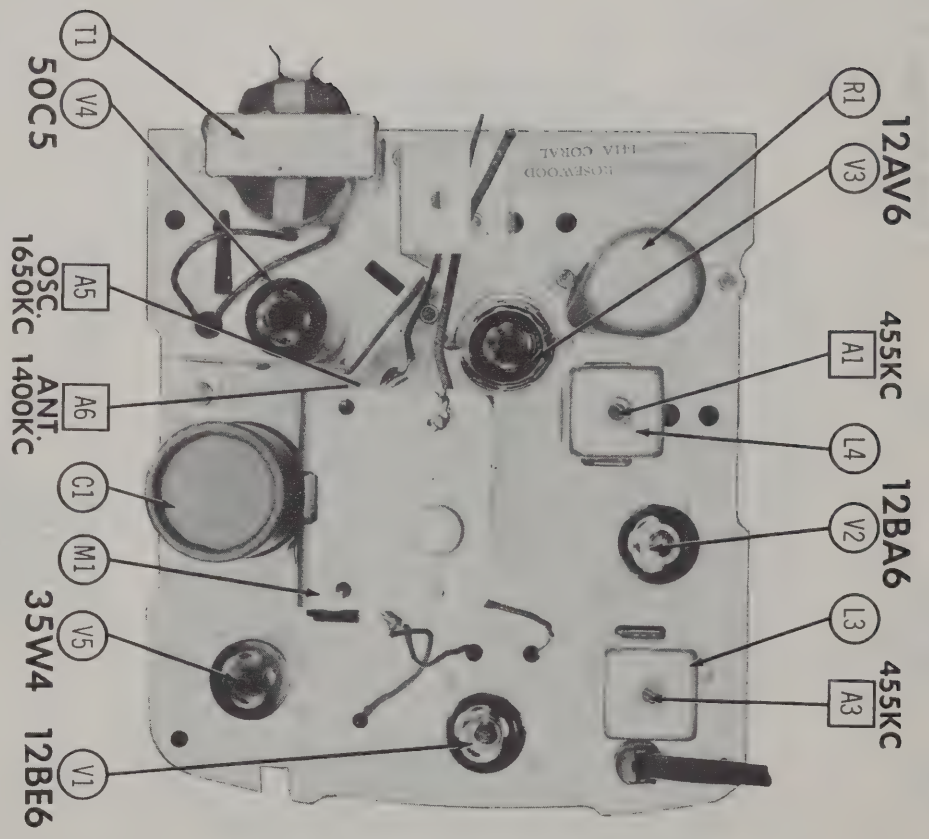
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: CORONADO PART No.	IRC PART No.	NOTES
R7A	500K	½	♦25764	BTS-470K	
B	500K	½		BTS-470K	
R8	120Ω	½		BTS-120	
R9	1200	1		BTA-1200	
R10	330K	½		BTS-330K	

♦ Items R7A, R7B, C6A, C6B, C6C are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: CORONADO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2.4KΩ	3.5Ω	41213-1	Z1101	A-3025	A-3332	26S58 ①	S-12X	① Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	CORONADO PART No.	QUAM PART No.	
SP1	4"	PM	3.5Ω	22875	4A07	

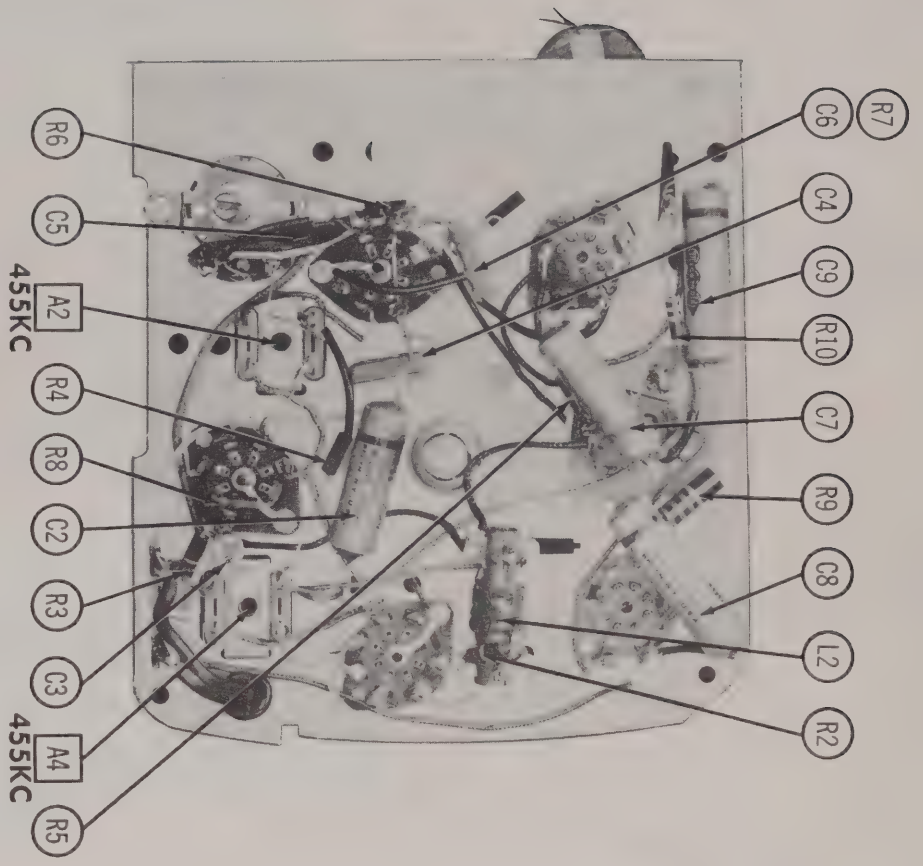
COILS (RF-IF)

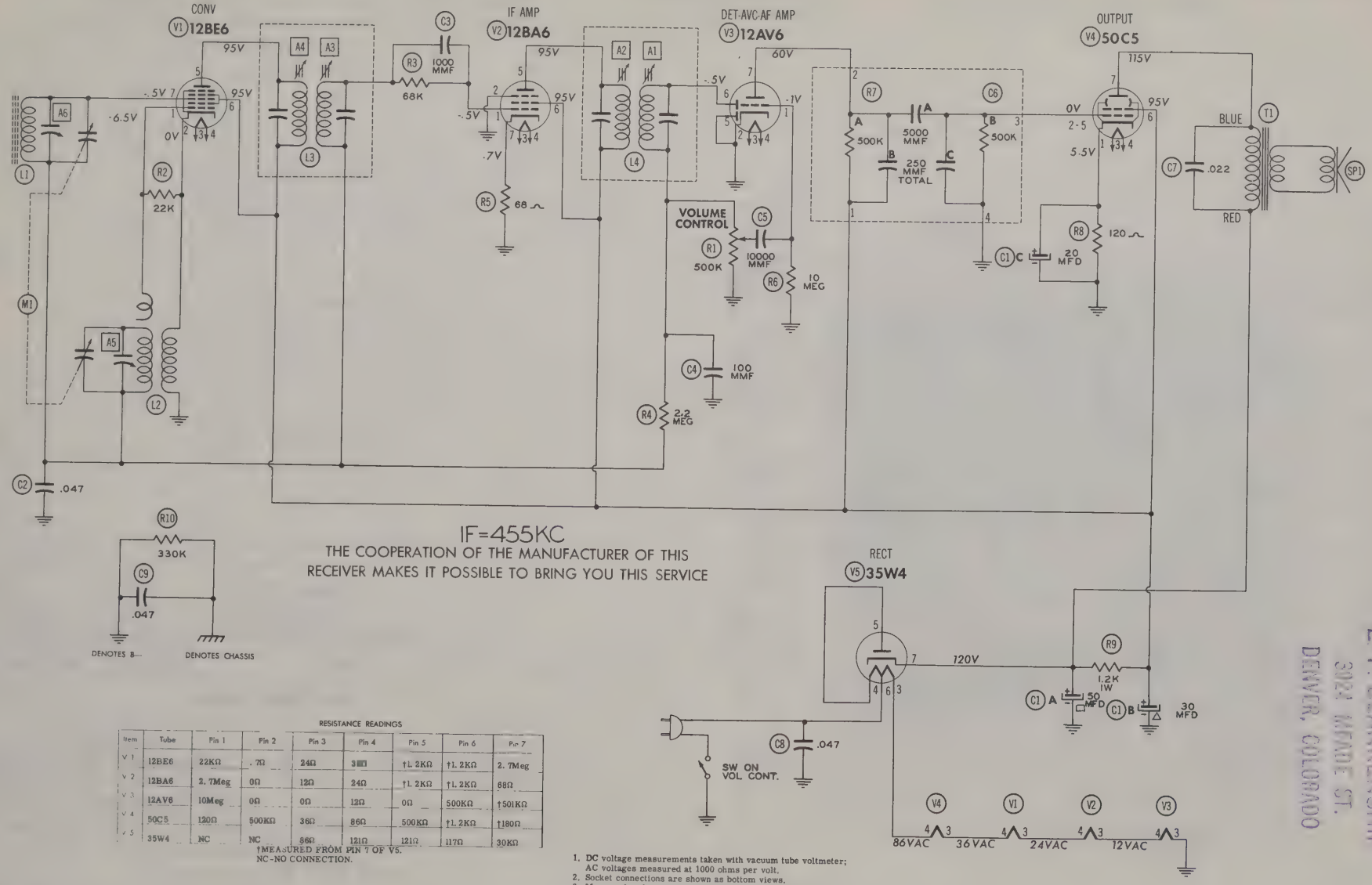
ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	CORONADO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.5Ω		41208-1				
L2	Osc. Coil	.8Ω	7.5Ω	41212-1	14-1073		69-Osc.	
L3	Input IF	20Ω	16Ω	40845-1	16-6758	BC-352	12-C1	
L4	Output IF	14Ω	14Ω	40845-1	16-6758	BC-353	12-C2	

MISCELLANEOUS

ITEM No.	PART NAME	CORONADO PART No.	NOTES
M1	Tuning Cap.	41846	2 Gang (23-320MMF, 23-170MMF)
	Cabinet	42016-6	Model RA44-8140A
	Cabinet	42016-7	Model RA44-8141A
	Knob	41832-7	On-Off-Volume
	Knob	41830-7	Tuning
	Crystal	41845	Dial

CHASSIS—BOTTOM VIEW





IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.7Ω	24Ω	3[illegible]	†1.2KΩ	†1.2KΩ	2.7Meg
V 2	12BA6	2.7Meg	0Ω	12Ω	24Ω	†1.2KΩ	†1.2KΩ	68Ω
V 3	12AV6	10Meg	0Ω	0Ω	12Ω	0Ω	500KΩ	†501KΩ
V 4	50C5	120Ω	500KΩ	36Ω	86Ω	500KΩ	†1.2KΩ	†180Ω
V 5	35W4	NC	NC	86Ω	121Ω	121Ω	117Ω	30KΩ

†MEASURED FROM PIN 7 OF V5.
NC-NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1955

PROPERTY OF
L. F. BLANKENSHIP
3024 MEADE ST.
DENVER, COLORADO

PHOTOFACT* Folder

RETMA MEMBER

CROSLEY MODELS H-21CKBF, CKBU, CKMF, CKMU, HKBF, HKBU, HKMF, HKMU, TKBF, TKBU, TKMF, TKMU (Ch. 466, A, 467)

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

MODEL H-21TKBF

CROSLEY MODELS H-21CKBF, CKBU, CKMF, CKMU, HKBF, HKBU, HKMF, HKMU, TKBF, TKBU, TKMF, TKMU (Ch. 466, A, 467)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

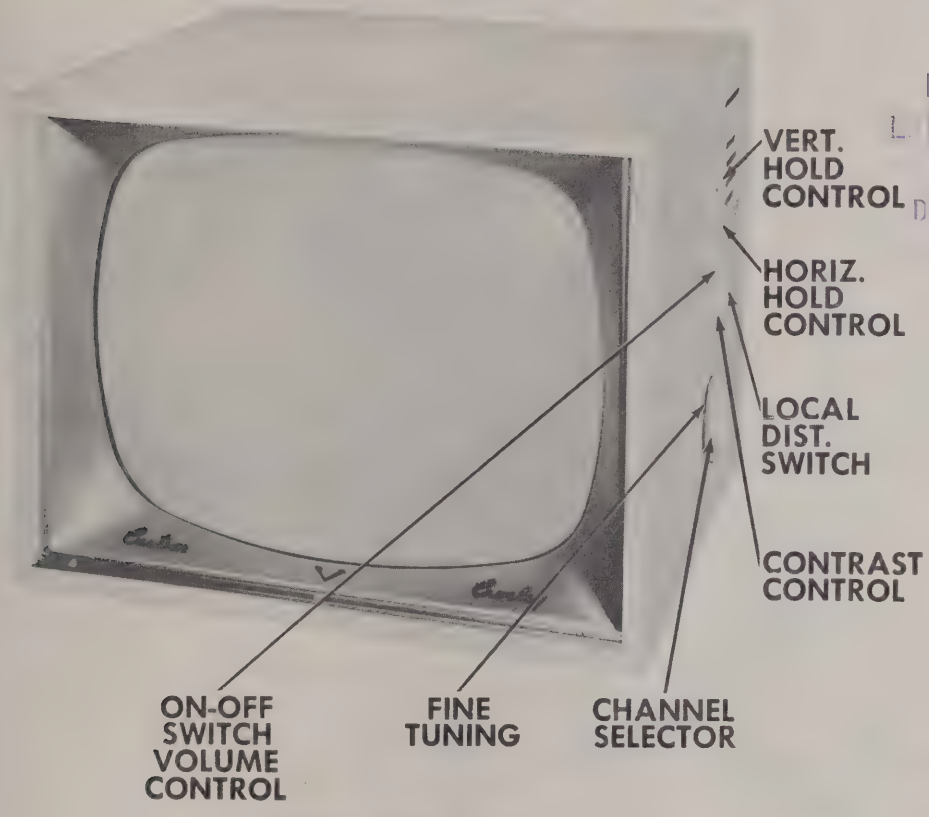
"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 12–55 SET 301 FOLDER 3

PHOTOFACT* Folder
*TRADE MARK

CROSLEY MODELS H-21CKBF, CKBU, CKMF, CKMU, HKBF, HKBU, HKMF, HKMU, TKBF, TKBU, TKMF, TKMU (Ch. 466, A, 467)

PROPERTY OF



CROSLEY MODEL H-21TKBF (Ch. 466A)

TRADE NAME	Crosley	MODELS	CHASSIS
		H-21CKBF, H-21CKMF, H-21HKBF, H-21HKMF, H-21TKBF, H-21TKMF	466
		H-21TKBF	466A
		H-21CKBU, H-21CKMU, H-21HKBU, H-21HKMU, H-21TKBU, H-21TKMU	467
MANUFACTURER	Crosley Corporation, 1329 Arlington St., Cincinnati, Ohio		
TYPE SET	Television Receiver		
TUBES	Sixteen		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.28 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video 45.75MC, Sound IF 41.25MC (Intercarrier)		

INDEX

Alignment Instructions 6, 7
Disassembly Instructions 18
Horizontal Sweep Circuit Adjustments 11
Parts List and Descriptions ..... 13 thru 16
Photographs
- Cabinet-Rear View 11
- Capacitor Identification 4, 9
- Chassis-Top View 3
- RF Tuner 16, 17
- Resistor Identification 19, 20
- Trans., Inductor & Alignment Identification 3

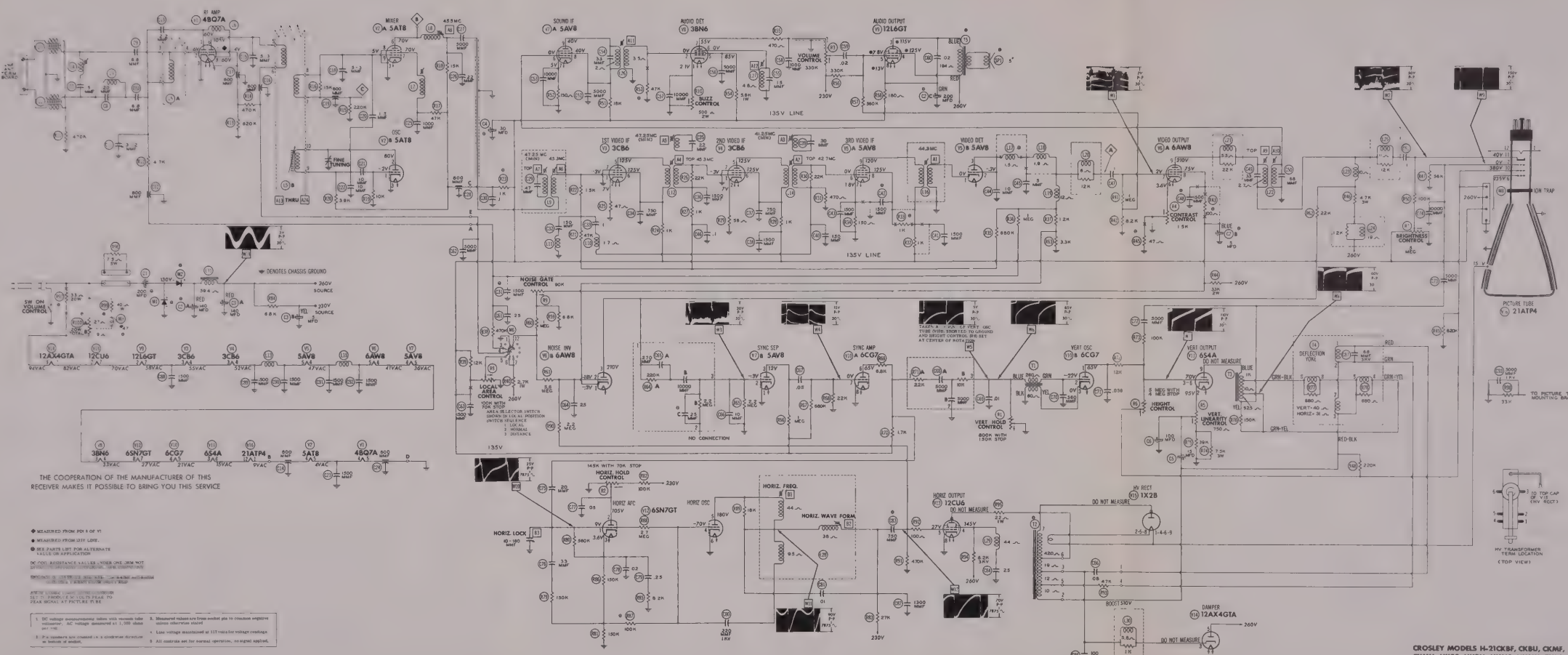
Resistance Measurements 8
Servicing in the Field 18
Schematic (Alternate Tuner) 10
Schematic (TV) 2
Trouble Shooting Aids 12, 17
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 12-55 SET 301 FOLDER 3

CROSLEY MODELS H-21CKBF, CKBU, CKMF, CKMU, HKBF, HKBU, HKMF, HKMU, TKBF, TKBU, TKMF, TKMU (Ch. 466, A, 467)



THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

◆ MEASURED FROM PIN 8 OF V1
● MEASURED FROM 135V LINE.
■ SEE PARTS LIST FOR ALTERNATE VALUES OR APPLICATION

DC COIL RESISTANCE MAY BE UNDER ONE OHM NOT DETECTABLE ON ORDINARY OHMMETERS. USE OHMMETER

SPECIFIED R, C OR L IS NOT INCLUDED IN A CIRCUIT BUT IS ADDED TO A PARASITIC FROM ABOUT WHICH

AFTER ALIGNMENT, CHECK VERTICAL LINEARITY BY TUNING IN A PATTERN WITH VERTICAL LINES. THE SPACING BETWEEN THE LINES SHOULD BE APPROXIMATELY EQUAL FROM TOP TO BOTTOM OF PICTURE.

1. DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1,000 ohms per volt.
2. If no numbers are counted in a clockwise direction as bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated
4. Line voltage maintained at 117 volts for voltage readings
5. All controls set for normal operation, no signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1955

CROSLEY MODELS H-21CKBF, CKBU, CKMF, CKMU, HKBF, HKBU, HKMF, HKMU, TKBF, TKBU, TKMF, TKMU (Ch. 466, A, 467)

CROSLEY MODELS H-21CKBF, CKBU, CKMF, CKMU, HKBF, HKBU, HKMF, HKMU, TKBF, TKBU, TKMF, TKMU (Ch. 466, A, 467)

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No	RATING CAP	RATING VOLT	REPLACEMENT DATA CROSLEY Part No.	CENTRALAB Part No.	ERIE Part No.	MALLORY Part No.	NOTES
C58	1000		152215-17	DD-102	801-001	DC-531	
C59	02	200	39001-80	DF-303	817-02	PT413	
C60	02	400	39001-80	DF-303	817-02	PT613	
C61	25	25	157810-1			PT4025	
C62	5000		144675-3	DD-502	811-005	DC-525	
C63	1500		144675-20	DD-152	801-0015	DC-5215	
C64	25	25	157810-1			PT4025	
C65A	270				GP5K-271	UC-5327	
B	10000		†150583-1	†PC-363	811-01	DC-511	
C	25				GP1K-250	UC-5425	Note 3
C66	10		157787-135	D6-100	GP1K-100	UC-541	
C67	05	200	39001-17	DF-503		PT415	
C68A	5000		♦157813-1	♦PC-108	811-005	DC-535	
B	5000				811-005	DC-525	
C69	01	400	39478-41	D6-103	GP2-333-103	PT611	
C70	560		144675-32	DD-561	811-561	UC-5356	
C71	056	400	39478-78				
C72	5000		152215-34	DD-502	811-005	DC-525	
C73	5000		152215-25	DD-502	811-005	DC-525	
C74	10000		39478-61	DD-103	811-01	DC-531	
C75	20		157787-61	D6-200	GP1K-200	UC-542	
C76	33		157787-136				
C77	05	400	39001-17	DF-503		PT415	
C78	02	200	39001-80	DF-303	817-03	PT413	
C79	25		157810-1			PT4025	
C80	220	1000	137499-58				
C81	01	400	146515-3				
C82	1300		137499-57				
C83	750			DD-751	GP2K-751	UC-5375	Note 4
C84	25	400	39001-87			PT4025	
C85	100	3000	152215-33	DD80-101	2KV-101	DC3031	
C86	02	300	139433-1				
C87	68	3000	152215-3	DD30-680	3KV-680	DC30468	
C88	1500		144675-30	DD-152	801-0015	DC-5215	
C89	1500		144675-30	DD-152	801-0015	DC-5215	
C90	1500		144675-30	DD-152	801-0015	DC-5215	
C91	1500		144675-30	DD-152	801-0015	DC-5215	
C92	1500		144675-30	DD-152	801-0015	DC-5215	
C93	5000	1000	152215-4	DD-502			

Note 2. Used on chassis 467 only.
Note 3. C64C is not used.
Note 4. Some versions use 1200MMF in this application (part #144675-33).
Note 5. Early versions use 2000MMF in this application (part #152215-6).
Note 6. Not used in early versions.
† Items C65A, C65B, C65C, R64A, and R64B are combined in one unit.
♦ Items C68A, C68B, R71A and R71B are combined in one unit.

CONTROLS

ITEM No	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CROSLEY Part No.	IRC Part No.	CLAROSTAT Part No.	CENTRALAB Part No.	MALLORY Part No.	INSTALLATION NOTES
R1A	800KΩ	½	150338-1	Q1-1361	A47-750K-8†	AB-68†	TA35L †	Vertical Hold (Stop at 150KΩ)
B	Shaft		Not Req.	Not Req.	FS-3	AK-3	Not Req.	Attach to R1A.
R2A	145KΩ	½	157802-1	Q1-1251	A47-75K-8♦	B-35♦	U-41♦	Horizontal Hold (Stop at 70KΩ)
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A.
R3A	330KΩ	½	157803-1	Q3-123	A47-500K-2▲	AB-50	TA339A	Volume
B	Shaft		Not Req.	Not Req.	FS-3	AK-3	Not Req.	Attach to R3A.
C	Switch		Not Req.	Not Req.	SWS-12	US-28	US-28	Attach to R3A.
R4A	1500Ω	½	157804-1	Q1-109		AB-515	U-5	Contrast
B	Shaft		Not Req.	Not Req.		AK-3	Not Req.	Attach to R4A.
R5A	750Ω	½	157806-1	Not Req.	A47-750-8	AB-5	S01-4	Vertical Linearity
B	Shaft		Not Req.	Not Req.	RN-3	AK-19	Not Req.	Attach to R5A.
R6A	5Meg	½	157805-1	Q1-1414	A47-4Meg6▲	AB-984	SL-67▲	Height (Stop at 4Meg)
B	Shaft		Not Req.	TQ	RN-3	AK-19	Not Req.	Attach to R6A.
R7A	5Meg	½	157801-1	Q1-141	A47-5Meg-8		TA58R	Brightness
B	Shaft		Not Req.	Not Req.	FS2-1/4		Not Req.	Attach to R7A.
R8A	100KΩ	½	150335-1	Q1-135♦	A47-75K-8♦	AB-35♦		Local Area (Stop at 70KΩ)
B	Shaft		Not Req.	TQ	RN-3	AK-19		Attach to R8A.
R9	90KΩ	½	150037-1					Noise Gate
R10	500Ω	2	157395-3		35-500			Buzz (Wire Wound)

† Connect a 150KΩ resistor in series with the left hand terminal of the control and the lead connecting to the same terminal of the original control. (Control viewed from shaft end, terminals down.)
♦ Connect a 70KΩ resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (Control viewed from shaft end, terminals down.)
▲ Connect a 1Meg resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (Control viewed from shaft end, terminals down.)
* Connect a 33KΩ resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (Control viewed from shaft end, terminals down).

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CROSLEY Part No.	IRC Part No.	NOTES
R11	470KΩ	½		BTS-470K	
R12	4700Ω 5%	½		BTS-4700 5%	
R13	830KΩ	½	39374-25	BTS-1000	
R14	470KΩ	½	39374-35	BTS-1000	
R15	230KΩ	½	39374-9	BTS-47	
R16	15KΩ	½	39374-41		
R17	47KΩ	½	39374-41		
R18	15KΩ	½	39374-41		
R19	10KΩ	½	39374-41		
R20	3900Ω	½	39374-41		
R21	47KΩ	½	39374-45	BTS-47K	
R22	1500Ω	½	39374-27	BTS-1500	
R23	1000Ω	½	39374-25	BTS-1000	Note 1
R24	1000Ω	½	39374-25	BTS-1000	
R25	47Ω	½	39374-9	BTS-47	
R26	22KΩ	½	39374-41		
R27	1000Ω	½	39374-25	BTS-1000	
R28	1000Ω	½	39374-25	BTS-1000	
R29	5Ω	½	39374-10	BTS-5R	
R30	22KΩ	½	39374-43		
R31	470Ω	½	39374-31	BTS-470	
R32	1000Ω	½	39374-25	BTS-1000	
R33	1000Ω	½	39374-25	BTS-1000	Note 3
R34	150Ω	½	39374-15	BTS-150	
R35	680KΩ	½	39374-59		
R36	1Meg	½	39374-61		
R37	1200Ω	½	39374-29	BTS-1200	
R38	470KΩ	½	39374-57		
R39	12KΩ	½	39374-33	BTS-12K	
R40	2700Ω	½	39374-118	BTA-2700	
R41	1Meg	½	39374-61		
R42	8200Ω	½	39374-36		
R43	100Ω	½	39374-13	BTS-100	Note 2
R44	33K	2	39374-219		
R45	47Ω	½	39374-9	BTS-47	Note 2
R46	4700Ω	3	156911-9		
R47	58KΩ	½	39374-46		
R48	220KΩ	½	39374-53	BTS-220K	
R49	820KΩ	½	39374-60	BTS-820K	
R50	100KΩ	½	39374-49		
R51	18KΩ	½	39374-40	BTS-18K	
R52	150Ω	½	39374-15	BTS-150	
R53	47KΩ	½	39374-45	BTS-47K	
R54	5600Ω	½	39374-123	BTA-5600	
R55	470Ω	½	39374-31	BTS-470	
R56	330KΩ	½	39374-55	BTS-330K	
R57	560KΩ	½	39374-58	BTS-560K	
R58	180Ω	1	39374-104	BTA-180	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CROSLEY Part No	IRC Part No	NOTES
R59	6800Ω	½	39374-35	BTS-6800	
R60	1Meg	½	39374-61	BTS-1Meg	
R61	5.6Meg	½	39374-79	BTS-5.6Meg	
R62	22KΩ	½	39374-41	BTS-22K	
R63	33000Ω	½	39374-51	BTS-3300	
R64A	220KΩ	½	†150583-1		
B	2.2Meg	½			
R65	2.2Meg	½	39374-69		
R66	1Meg	½	39374-61		
R67	680KΩ	½	39374-59		
R68	22KΩ	½	39374-41		
R69	6800Ω	½	39374-35		
R70	47000Ω	½	39374-53		
R71A	22KΩ	½	♦157813-1		
B	10KΩ	½	39374-38		
R72	12KΩ	½	39374-33		
R73	100KΩ	½	39374-49		
R74	7500Ω	3	156911-4		
R75	33KΩ	½	39374-44		
R76	150KΩ	½	39374-51		
R77	680Ω	½	39374-23		
R78	680Ω	½	39374-23		
R79	150KΩ	½	39374-51		
R80	560KΩ	½	39374-58		
R81	150KΩ	½	39374-51		
R82	100KΩ	½	39374-49		
R83	27KΩ	½	39374-42		
R84	6800Ω	½	39374-35		
R85	6200Ω	½	39374-36		
R86	150KΩ	½	39374-51		
R87	100KΩ	½	39374-48		Note 4
R88	2.7MΩ	½	39374-71		
R89	18KΩ	½	39374-40		
R90	2.2MΩ	½	39374-69		
R91	470KΩ	½	39374-57		
R92	100Ω	½	39374-13		
R93	4700Ω	½	39374-33		
R94	68000Ω	3	156911-10		
R95	22Ω	1	39374-93		
R96	7.5Ω	5	154089		
R97	33Ω	20	156210-6		Note 5
R98	33KΩ	1	39374-131	BTA-33K	
R99	40Ω	1	158646-1		Note 6
R100	27Ω	20	158880-3		Note 6
	96Ω				

Note 1. A 2200 ½W resistor is used on chassis 467.
Note 2. Not used in early production with no code letter, chassis 466 & 467.
Note 3. In some versions this resistor is not used.
Note 4. A 68K ½W resistor or 82KΩ ½W resistor is used in some versions.
Note 5. Not used in chassis 467.
Note 6. Used in chassis 467 only.
† Items C65A, C65B, C65C, R64A, R64B are combined in one unit.
♦ Items C68A, C68B, R71A, R71B are combined in one unit.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA CROSLEY Part No	Halldorson Part No	Merit Part No	RCA TYPE No	Ram Part No	Stancor Part No	Thordarson Part No	Triad Part No
T1	Vert. Osc. Trans.	155255-3	S6702	A-3008	V40S	A-8125	24A03	A-97X	
T2	Horiz. Output Trans.	150413-1-3⑤	F3418*	HVO-37*	X123*	A-8263*	F1y-25*	D-68*	
		157412-2 ③④							
T3	Vert. Output Trans.	158736-2		A-3324					
T4A	Yoke(90°)Horiz.(30M	158436-1 ①	DF607②	MDF-62			DY-16A④	Y-16 ④ ⑤	Y-61-1④
	Vert.(60MH)		③ ⑤				⑤		

① Complete assembly includes: Resistors R77 & R78, Capacitors C87. Does not include yoke rear cover & centering device, Crosley Part #153586-1.
② Use original rear cover and centering device.
③ Use original horizontal damping network.
④ Complete assembly includes: Iron Core (2 used), Crosley Part #158499-1.
Mtg. Board, Crosley Part #158405-1.
Term Board, Crosley Part #158475-1
Core Spring, Crosley Part #158406-1
⑤ Alternate horiz. output trans.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
7	7	7		H.V.	7	H.V.	H.V.
6	6	6	3	6	6	6	6
3	3	3	7	3	3	3	3
5	5	5	2	5	5	5	5
2	2	2	6	2	2	2	2

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI	IMPEDANCE SEC	REPLACEMENT DATA CROSLEY Part No	Halldorson Part No	Merit Part No	Stancor Part No	Thordarson Part No	Triad Part No	NOTES
T5	2 2KΩ	3.4Ω	157919-1-5 157919-1 ②	21010 ①	A-3025	A-3576 ①	22S90 ①	S-1X ①	① Drill one new mounting hole. ② Alternate audio output.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V C IMP	REPLACEMENT DATA CROSLEY Part No	QUAM Part No	NOTES
SP1	5"	PM	3.4Ω	C-158793-1-2 ① C-158793-1 ②	5A01	① Used in Models H-21TKMF, H-21TKMU, H-21TKBE and H-21TKBU. ② Alternate 5" PM speaker
	8"x12"	PM	3.4Ω	158734-1 ③		③ Used in Models H-21CKMF, H-21CKMU, H-21CKBF, H-21CKBU, H-21EKMF, H-21EKMU, H-21EKBF, and H-21EKBU.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA CROSLEY Part No	MEISSNER Part No.	MERIT Part No.	MILLER Part No.	NOTES
L1	Ant. Matching Trans	0Ω	0Ω					
L2	Ant. Matching Trans.	0Ω	0Ω					
L3	IF Trap	0Ω						
L4	IF Trap			159739-1				
L5A	Ant.,RF,Mixer Grid,Osc. Coils	0Ω		159508-3				Channel 2
B	Ant.,RF,Mixer Grid,Osc. Coils	0Ω		159509-3				Channel 3
C	Ant.,RF,Mixer Grid,Osc. Coils	0Ω		159508-4				Channel 4
D	Ant.,RF,Mixer Grid,Osc. Coils	0Ω		159508-5				Channel 5
E	Ant.,RF,Mixer Grid,Osc. Coils	0Ω		159508-6				Channel 6
F	Ant.,RF,Mixer Grid,Osc. Coils	0Ω		159508-7				Channel 7
G	Ant.,RF,Mixer Grid,Osc. Coils	0Ω		159508-8				Channel 8
H	Ant.,RF,Mixer Grid,Osc. Coils	0Ω		159508-9				Channel 9
I	Ant.,RF,Mixer Grid,Osc. Coils	0Ω		159508-10				Channel 10
J	Ant.,RF,Mixer Grid,Osc. Coils	0Ω		159508-11				Channel 11
K	Ant.,RF,Mixer Grid,Osc. Coils	0Ω		159508-12				Channel 12
L	Ant.,RF,Mixer Grid,Osc. Coils	0Ω		159508-13				Channel 13
L6	Osc. Coil	0Ω						
L7	RF Coil	0Ω						
L8	Cover Plate							
L9	1st Video IF	.1Ω		159385-1	17-5003*	TV-128*	6233*	Includes 47.25MC Trap.
L10	RF Coil	1.7Ω		159443-1	19-1004		4610	5.5 Microhenries
L11	RF Choke	0Ω		159447-1				.004 Microhenry
L12	2nd Video IF	.2Ω	.2Ω	159384-1			6232	Includes 47.25MC Trap.
L13	PIL Choke	0Ω		150704-1	19-1000		4602	1 Microhenry
L14	3rd Video IF	.2Ω	.2Ω	159418-2			6231	Includes 41.25MC Trap.
L15	PIL Choke	0Ω		159681-1	19-1000		4602	1 Microhenry
L16	4th Video IF	.3Ω	.3Ω	159627-1	17-5004*	TV-125*	6234*	
L17	Series Peaking Coil	1.5Ω		159580-1	19-1004		4610	5.5 Microhenries-Note 1
L18	Series Peaking Coil	1.9Ω		158698-1	19-1005		4613	8 Microhenries
L19	Shunt Peaking Coil	12Ω		159396-1	19-1023	TV-129	6123	250 Microhenries
L20	Series Peaking Coil	6Ω		159395-1	19-1100+	TV-161+	6113+	103 Microhenries, Wound on 12KΩ resistor
L21	Series Peaking Coil	5.8Ω		159400-1	19-3093+	TV-151+	6177+	90 Microhenries, Wound on 22KΩ resistor
L22A	A. SMC Trap	2.7Ω						
B	at Sound IF	.9Ω		159420-2				
L23	Shunt Peaking Coil	10Ω		159399-1	19-1350	TV-125	6121	250 Microhenries
L24	Shunt Peaking Coil	19Ω		159398-1	19-4940††		6156+	843 Microhenries Wound on 1.2KΩ resistor
L25	Series Peaking Coil	11Ω		159397-1	19-3250+	TV-165+	6130+	373 Microhenries, Wound on 12KΩ resistor
L26	2nd Sound IF	2Ω	3.6Ω	157856-1				
L27	Quadrature Coil	4.6Ω		157842-1	20-1005	TV-151	1460	
L28	Horiz. Osc.	44Ω	95Ω	157791-1	20-1402†	TV-162†	6182†	Waveform winding=38Ω
L29	RF Choke	44Ω		159462-1	19-1994	RC-527	4666	2.5 Microhenries
L30	RF Choke	5.8Ω		159463-1	19-3100+	TV-161+	6113+	103 Microhenries, Wound on 1KΩ resistor.

■ Cut out chassis hole & use adaptor plate. Use one winding only.
▪ Use adaptor plate.
• Parallel with 12KΩ resistor.
▫ Parallel with 2.2KΩ resistor.
† Reverse coil mounting in can.
# Parallel with 1KΩ resistor.
†† Parallel with 3KΩ resistor.
Note 1. Not used in early versions.

FILTER CHOKE

ITEM No	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE IO CURRENT 1000 (%)	REPLACEMENT DATA CROSLEY Part No	Halldorson Part No	Merit Part No	Stancor Part No	Thordarson Part No	Triad Part No
L31	.210ADC	58.4Ω	1.2EY	155539-1-3	C3040	C-3994	C-3337	38C41	C-31X ①

① Drill one new mounting hole.

SELENIUM RECTIFIER

ITEM No	RATING CURRENT	REPLACEMENT DATA CROSLEY Part No	FEDERAL Part No	INTERNATIONAL Part No	MALLORY Part No	RADIO RECEPTOR Part No	SARKES TARZIAN Part No	NOTES
M1	210ADC	C-155575-2-4 C-155575-2 ① C-155575-3-1 C-155575-3 ①	1236A	RS-250	6S300	6S4	300	① Alternate Selenium Rect.
M3	.210ADC	1236A		RS-250	6S300	6S4	300	

PROPERTY OF
L. F. BLANKENSHIP
3921 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		CROSLEY PART No.	STANDARD REPLACEMENT		
V1	RF Amp.	4BQ7A	4BQ7A	9AJ	
V2	Mixer-Osc.	5AT8	5AT8	9DW	
V3	1st Video IF Amp.	3CB6	3CB6	7CM	
V4	2nd Video IF Amp.	3CB6	3CB6	7CM	
V5	3rd Video IF Amp.-Video Det.	5AV8	5AV8		
V6	Video Output-Noise Inv.	6AW8	6AW8		
V7	Sound IF Amp. - Sync Sep.	5AV8	5AV8		
V8	Audio Det.	3BN6	3BN6	7DF	
V9	Audio Output	12L6GT	12L6GT	7S	
V10	Sync Amp. - Vert. Osc.	6CG7	6CG7		
V11	Vert. Output	6S4A	6S4A	9AC	
V12	Horiz. AFC-Horiz. Osc.	6SN7GT	6SN7GT	8BD	
V13	Horiz. Output	12CU6	12CU6	6AM	
V14	Damper	12AX4GTA	12AX4GTA	4CG	
V15	HV Rect.	1X2B	1X2B	9Y	

PROPERTY OF
L. F. BLANKENSHIP
30X4 MEADE ST.
DENVER, COLORADO

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA					RETMA BASE TYPE	NOTES
	CROSLEY PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.		
V16	21ATP4	21ATP4 ①	21ATP4 21ATP4A ①	21ATP4 ②	21ATP4	12L 12L	① Aluminized ② Silver Screen

ELECTROLYTIC CAPACITORS

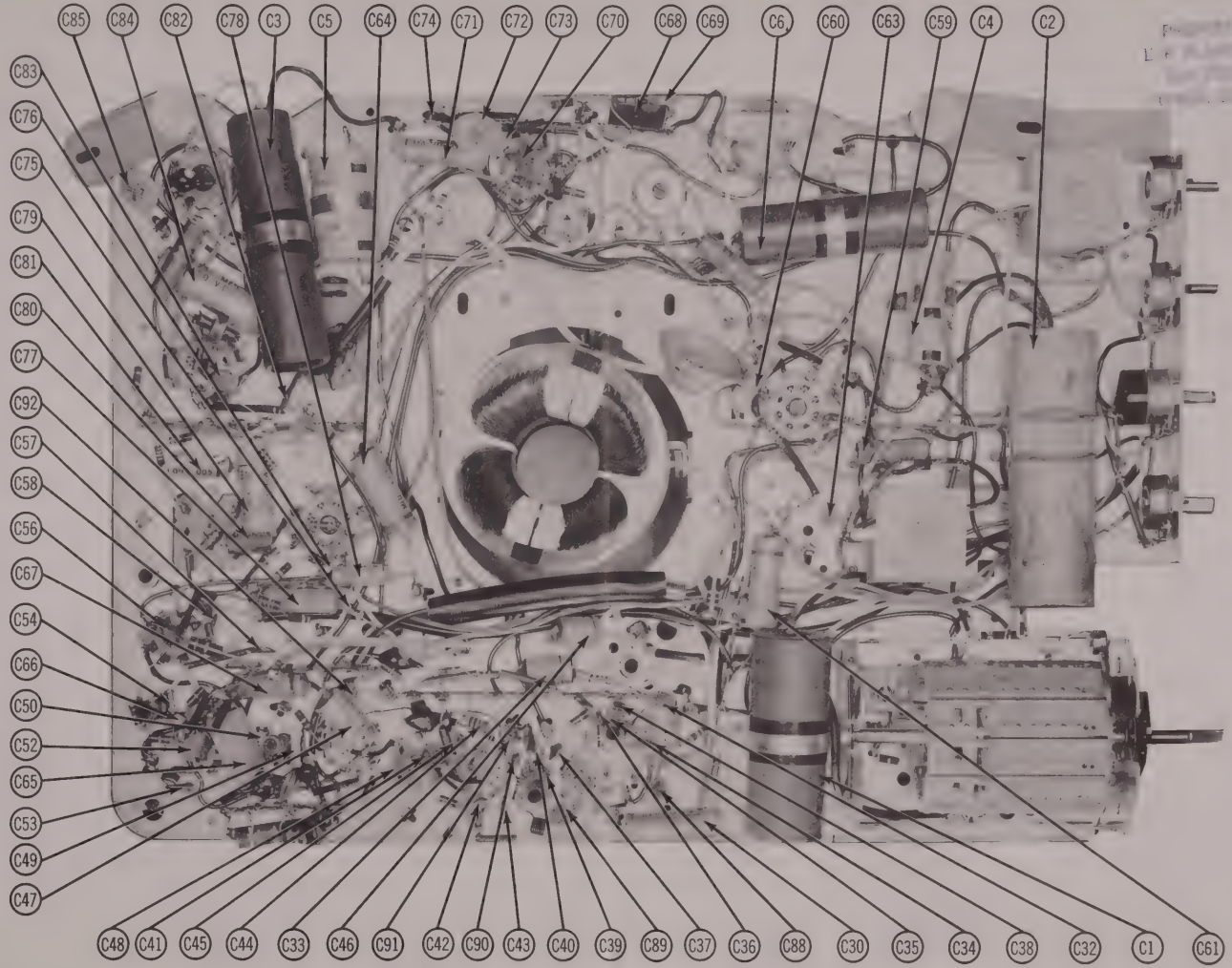
ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	CROSLEY PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1	200	200	158557-1	WS342	TD-200-200	D-100	
C2A	140	350	159318-1	WT449		Q-222	Note 1
B	5	300				D-100	Note 1
C	200	200					Note 1
C3A	140	350	159495-1	WD450		D-177	
B	5	350				MT-4504	
C4	30	200	159519-1	TC77	TD-30-250	FM-4530	Note 1
C5	15	525	159319-1	TC92	TD-10-600		
C6	100	150	159316-1			MT-15100	

Note 1. Late production models combine C2A, C2B, C2C and C4 in one 4-section unit (part #159520-1).

FIXED CAPACITORS

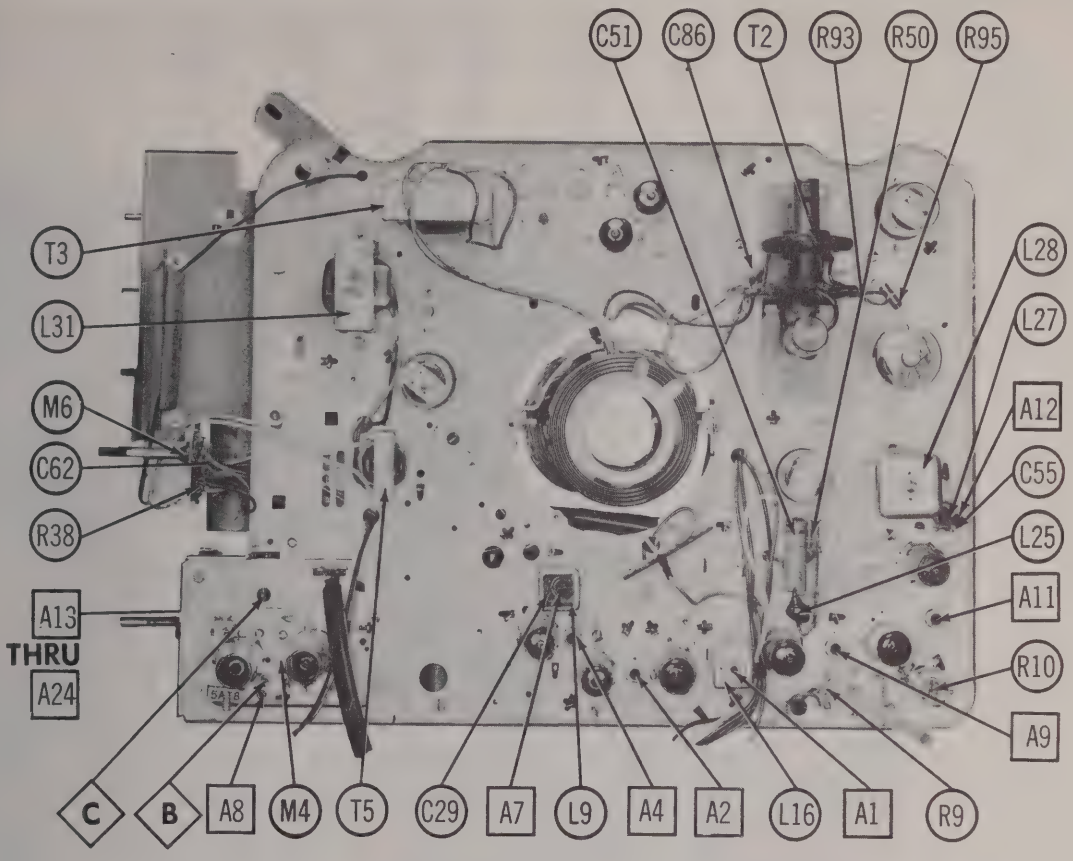
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	CROSLEY PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C7	5			TCZ-5	NP0A-050	ZT-555	
C8	120			DD-121	811-121	UC-5312	
C9	6.8			TCZ-6R8	NP0A-6R8	ZT-5568	
C10	6.8			TCZ-6R8	NP0A-6R8	ZT-5568	
C11	3-12						
C12	800						
C13	2.2			TCZ-2R2	NP0A-2R2		
C14	800						
C15	.5-3			829-3	3115-01-0R5	CT565A	
C16	800						
C17	800						
C18	.5-3			829-3	3115-01-0R5	CT565A	
C19	800						
C20	1.5			TCZ-1R5	NP0A-1R5	ZT-5515	
C21	10						
C22	10						
C23	1500			DD-152	801-0015	DC-5215	
C24	800						
C25	1000			DD-102	801-001	DC-521	
C26	22			TCZ-22	NP0K-220	ZT-5422	
C27	5000			DD-502	811-005	DC-525	
C28	800						
C29	47	500	137499-60	TCZ -47	NP0-338-470	ZT-5447	
C30	.1	200	39478-47	DF-104		PT401	
C31	1500		144675-30	DD-152	801-0015	DC-5215	Note 2
C32	150		158215-35	TCN-150	N750-337-151		
C33	.1	150	157906-1	DF-104		PT401	
C34	750		156201-5	DD-751	811-751	UC-5375	
C35	22	500	137499-59	TCZ-22	NP0K-220	MCE220	
C36	1500		144675-30	DD-152	801-0015	DC-5215	
C37	750		156201-5	DD-751	811-751	UC-5375	
C38	1500		144675-30	DD-152	801-0015	DC-5215	
C39	30	500	137499-45	TCZ-30	NP0L-300		
C40	150		158215-35	TCN-150	N750-337-151		
C41	1500		144675-30	DD-152	801-0015	DC-5215	
C42	1500		144675-30	DD-152	801-0015	DC-5215	Note 5
C43	1500		144675-30	DD-152	801-0015	DC-5215	
C44	10		137727-135	D6-100	GP1K-100	UC-541	
C45	5		137727-103	D6-050	GP1K-050	ZT-555	
C46	.1	150	157906-1	DF-104		PT401	
C47	.1	150	157906-1	DF-104		PT401	
C48	1500		144675-30	DD-152	801-0015	DC-5215	Note 6
C49	33		137727-126				
C50	68		137727-133				
C51	.1	400	39478-47	DF-104		PT401	
C52	5000		144675-2	DD-502	811-005	DC-525	
C53	10000		39478-41	DD-103	811-01	DC-511	
C54	33		137727-126				
C55	15		137727-43	TCN-15	N750K-150	NT-5415	
C56	5000		144675-2	DD-502	811-005	DC-525	
C57	10000		39478-41	DD-103	811-01	DC-511	



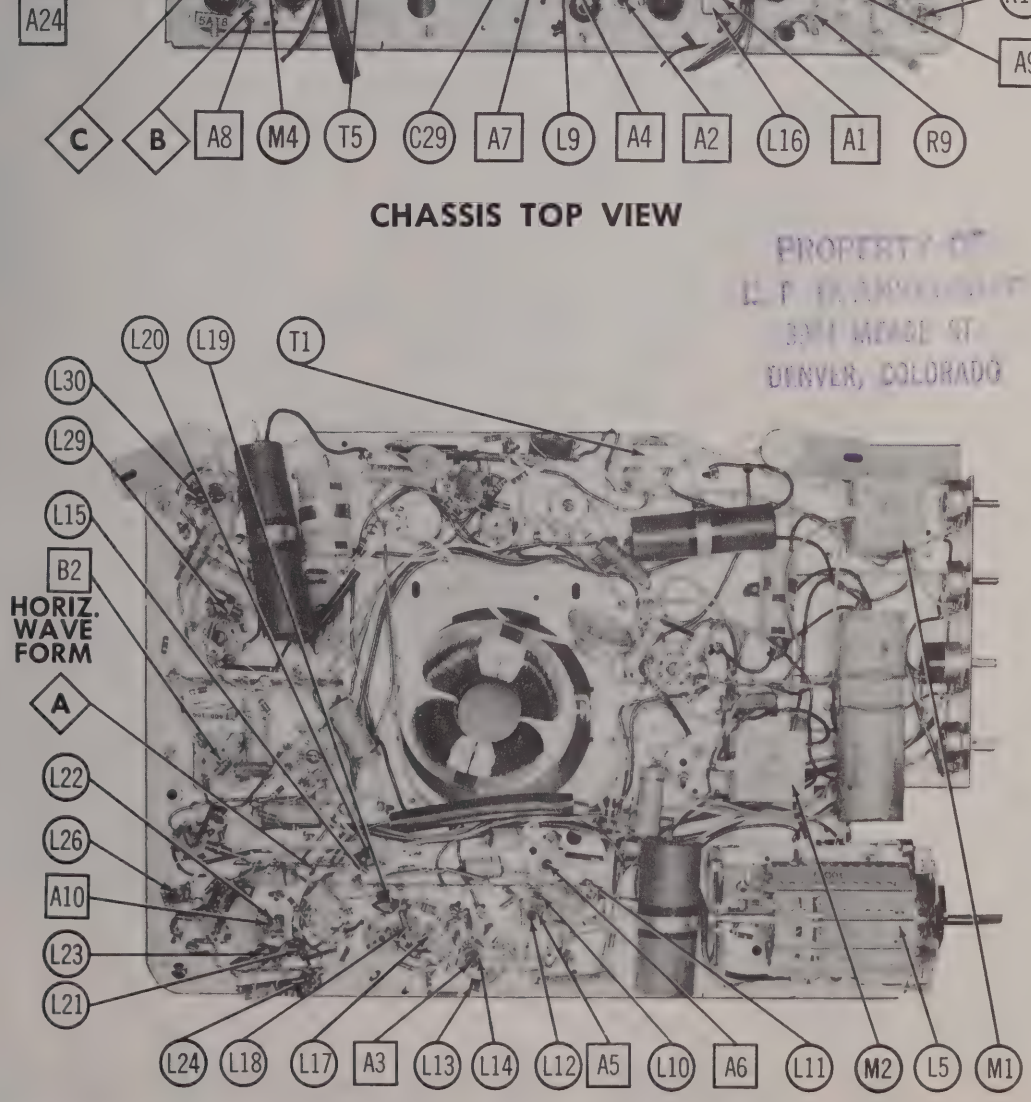
CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

CROSLEY HOTPOINT H-21CWBF, CWBU, CWMF, CWMU, HWBF, HWBU, HWMF, HWMU, TF6BF, TF6BU, TF6MF, TF6MU (Ch. 466, A, 467)



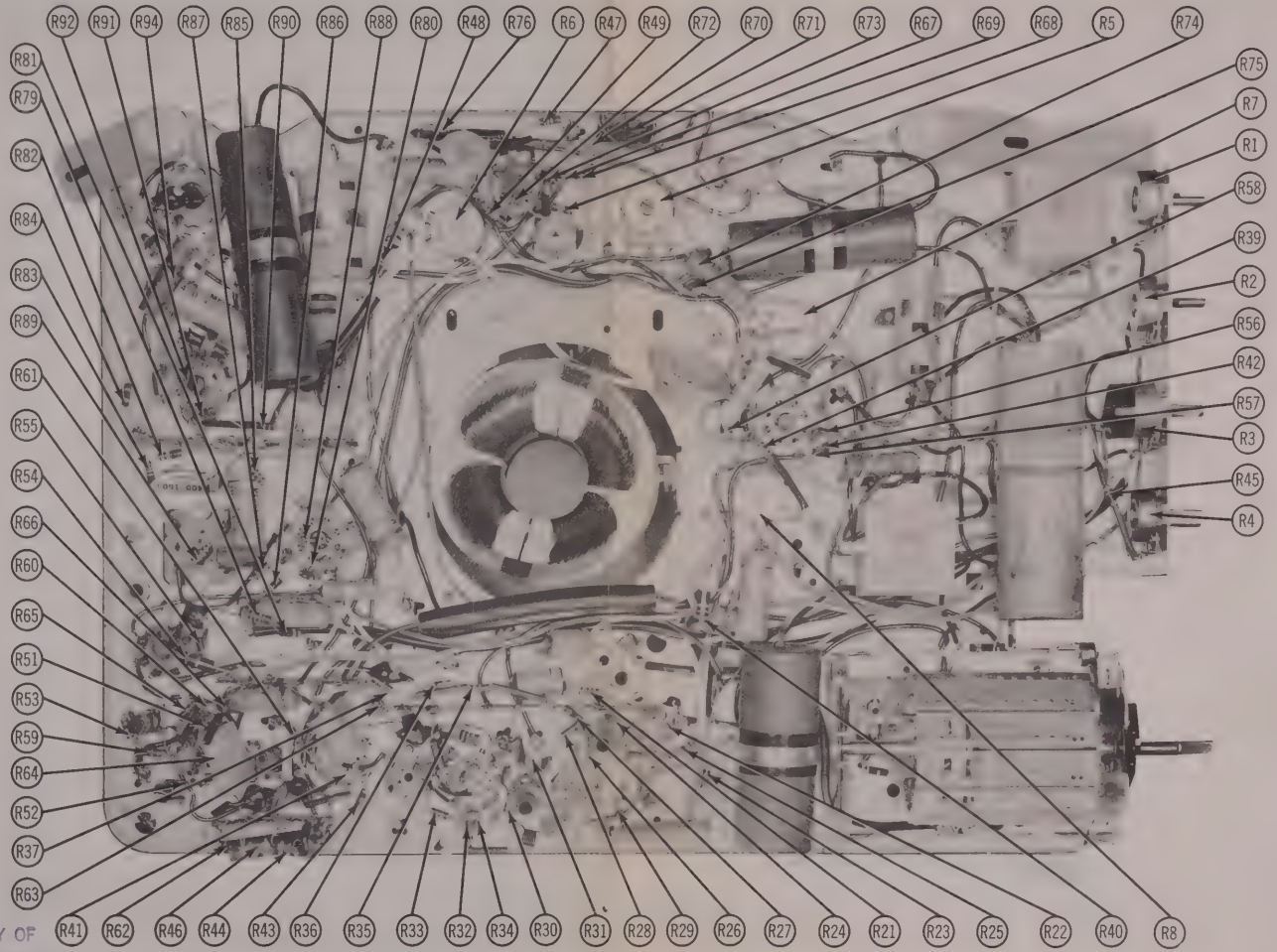
CHASSIS TOP VIEW

PROPERTY OF
[illegible]
3941 MEADE ST.
DENVER, COLORADO



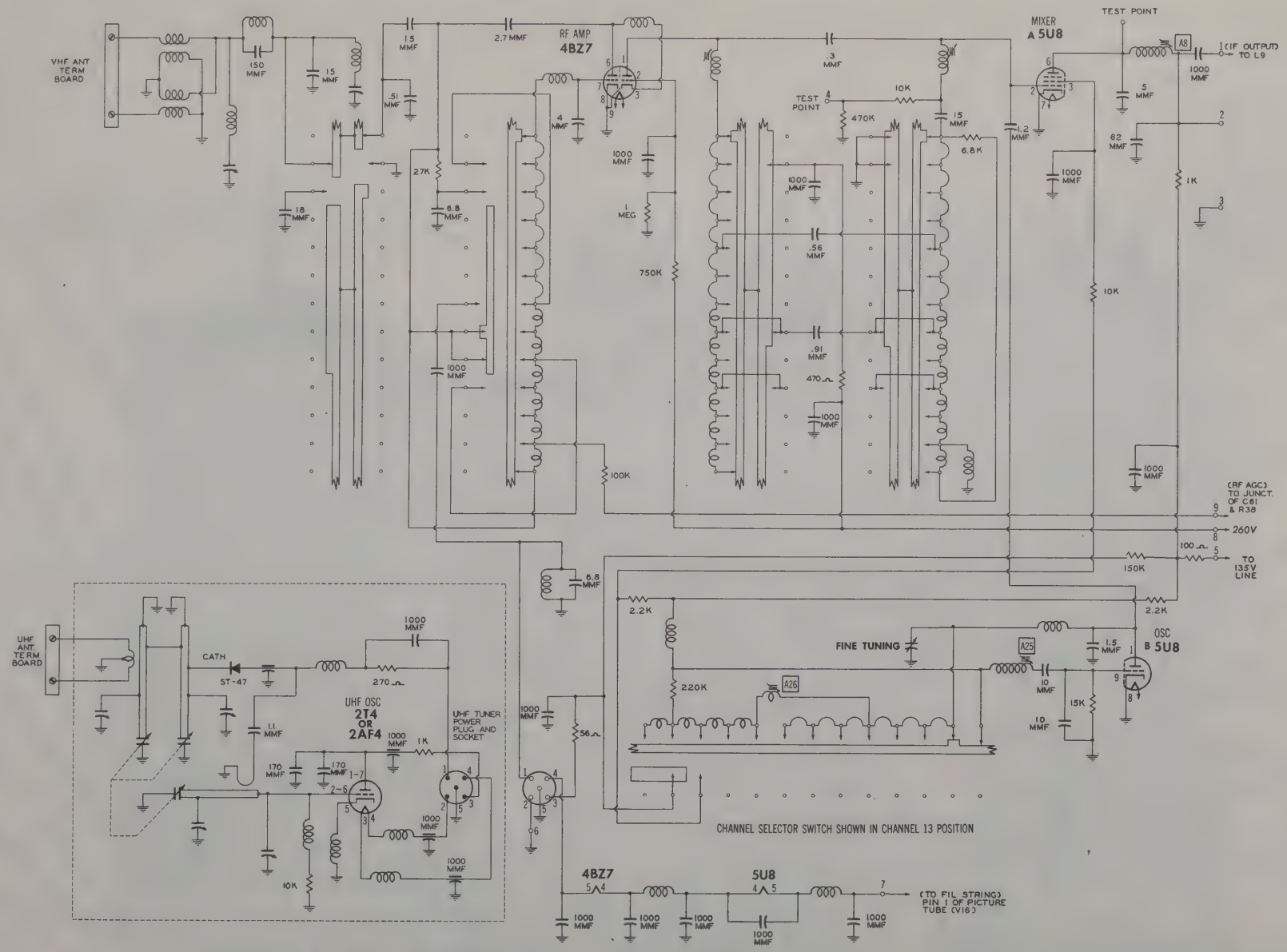
CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

SET 301 FOLDER 3



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



UHF TUNER PART NO. 159027-2, VHF TUNER PART NO. 159377-1 USED WITH CHASSIS 467

A PHOTOFACT STANDARD NOTATION SCHEMATIC

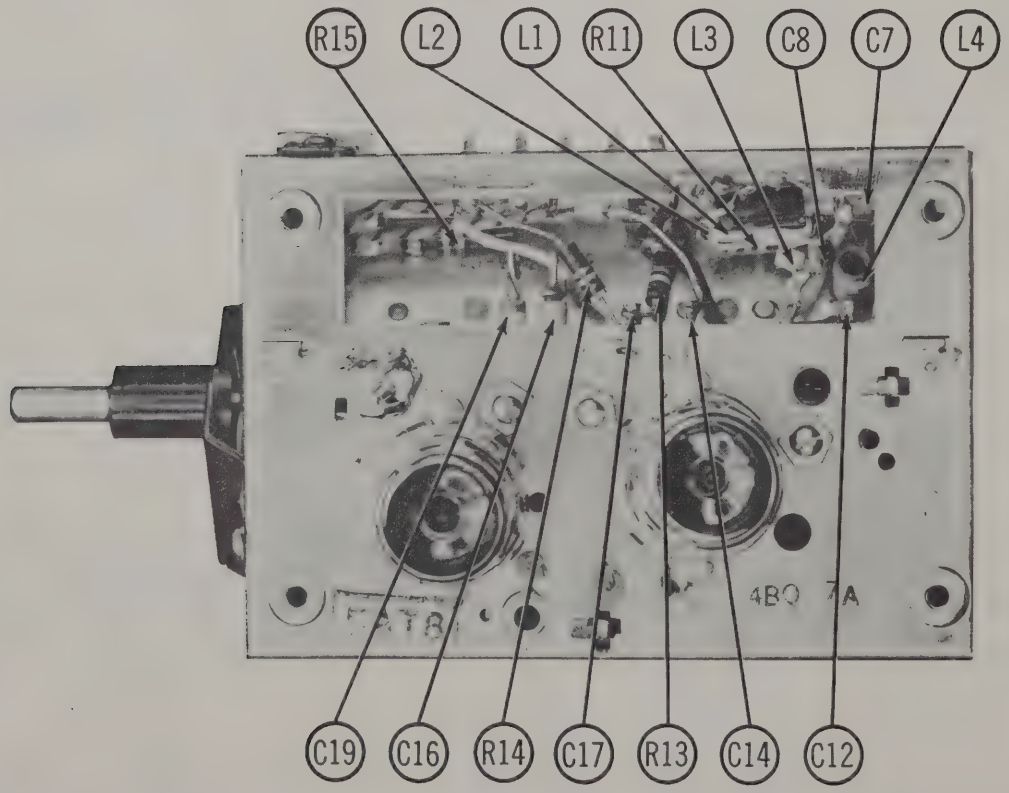
© Howard W. Sams & Co., Inc. 1955

ALTERNATE UHF-VHF TUNER SCHEMATIC

PARTS LIST AND DESCRIPTIONS (Continued)

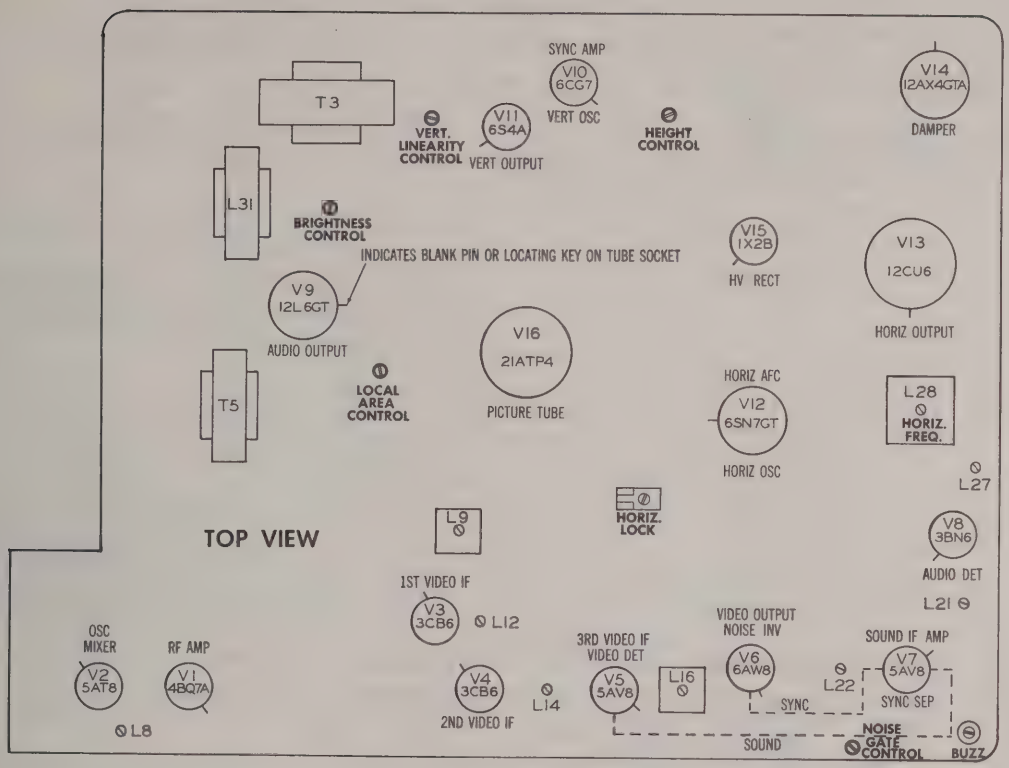
MISCELLANEOUS

ITEM No.	PART NAME	CROSLEY PART No.	NOTES
M3	Dial Light	138437-1	#47 - Chassis 467 only
M4	Tuner	159189-1	VHF - Chassis 466
	Tuner	159377-1	VHF - Chassis 467
M5	Tuner	159027-2	UHF - Chassis 467
M6	Switch	159239-1	Area Selector (Rotary - wafer type)
M7	Centering Device		Part of deflection yoke rear cover (T4)
M8	Ion Trap	153109-2	
B3	Trimmer Cap.	157870-1	Horiz. Lock (10-160MMF)
	Cabinet	159364-1	Less base - Models H-21TKMF, H-21TKMU
	Cabinet	159364-2	Less base - Models H-21TKBF, H-21TKBU
	Cabinet	159372-1	Less shelf - Models H-21CKMF, H-21CKMU
	Cabinet	159379-1	Less shelf & legs - Models H-21CKBF, H-21CKBU
	Cabinet	159378-1	Less shelf - Models H-21HKMF, H-21HKMU
	Cabinet	159380-1	Less shelf & legs - Models H-21HKBF, H-21HKBU
	Base	159283-1	Cabinet - Models H-21TKMF, H-21TKMU, H-21TKBF, H-21TKBU
	Knob	157750-7	Control (4 used) - Models H-21TKMF, H-21TKMU, H-21CKMF, H-21CKMU, H-21HKMF, H-21HKMU
	Knob	157750-8	Control (4 used) - Models H-21TKBF, H-21TKBU, H-21CKBF, H-21CKBU, H-21HKBF, H-21HKBU
	Knob	158939-4	Area Selector switch - Models H-21TKMF, H-21TKMU, H-21CKMF, H-21CKMU, H-21HKMF, H-21HKMU
	Knob	158939-5	Area Selector switch - Models H-21TKBF, H-21TKBU, H-21CKBF, H-21CKBU, H-21HKBF, H-21HKBU
	Knob	157753-6	VHF Channel selector - Models H-21TKMF, H-21CKMF, H-21HKMF
	Knob	157753-7	VHF Channel selector - Models H-21TKBF, H-21CKBF, H-21HKBF
	Knob	158740-2	UHF tuning - Models H-21TKMU, H-21CKMU, H-21HKMU
	Knob	158740-3	UHF tuning - Models H-21TKBU, H-21CKBU, H-21HKBU
	Knob	158694-3	VHF channel selector - Models H-21TKMU, H-21CKMU, H-21HKMU
	Knob	158694-4	VHF channel selector - Models H-21TKBU, H-21CKBU, H-21HKBU
	Knob	157754-1	Fine tuning - Models H-21TKMF, H-21TKBF, H-21CKMF, H-21CKBF, H-21HKMF, H-21HKBF
	Knob	158735-2	Fine tuning - Models H-21TKMU, H-21CKMU, H-21HKMU
	Knob	158735-3	Fine tuning - Models H-21TKBU, H-21CKBU, H-21HKBU
	Dial	158723-1	UHF channel indicator - Models H-21TKMU, H-21TKBU, H-21CKMU, H-21CKBU, H-21HKMU, H-21HKBU
	Mask & Name Plate Assy.	159427-1	
	Safety Glass	159054-1	



RF TUNER TOP VIEW

TUBE PLACEMENT CHART



PROPERTY OF
L F BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

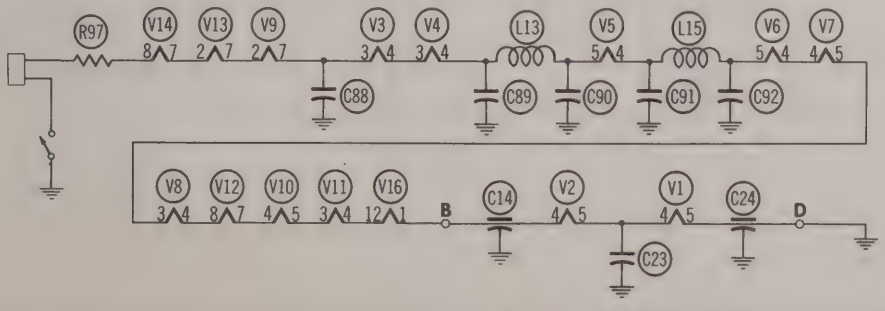
POWER SUPPLY FAILURE
No raster, no sound - **Selenium Rectifiers (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6, V9**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V16**
Has pic, no sound - **V7, V8, V9**

SYNC FAILURE
No vert. sync - **V10**
No horiz. sync - **V10, V12**
No vert. or horiz. sync - **V7, V10**

SWEEP FAILURE
No raster, has sound - **V12, V13, V14, V15, V16**
No vertical deflection - **V10, V11**
Poor vert. linearity or foldover - **V10, V11**
Poor horiz. linearity or foldover - **V12, V13, V14**
Narrow picture - **V12, V13, V14, V15, M1, M2**
Vert. off freq. - **V10**
Horiz. off freq. - **V10, V12**

NOTE: Since this receiver employs tubes used in series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative (See circuit below).



SET 301 FOLDER 3

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage lead should be securely taped and kept away from chassis.

VIDEO IF ALIGNMENT

Turn contrast control to minimum contrast position. Connect the negative lead of a 3 volt bias battery to the ungrounded side of C46. Common to chassis. Connect the negative lead of a 4.5 volt bias battery to the tuner AGC (brown) lead. Connect the positive lead to chassis.
Attenuate generator output to maintain not more than-2 volts at VTVM.
Note: In step 8, set signal generator at 46.0MC for adjustment of A8 on chassis 467 ONLY.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to point Ⓑ. Low side to chassis.	44.3MC (Unmod)	Any non-interfering channel	DC probe to point Ⓐ. Common to chassis.	A1	Adjust for maximum deflection.
2.	"	"	42.7MC	"	"	A2	Adjust for maximum deflection. If two peaks occur, use the peak nearest the clip end of the coil.
3.	"	"	41.25MC	"	"	A3	Adjust for MINIMUM deflection. Use enough signal generator output to produce 0.5 volts deflection, at MINIMUM reading. The correct null should occur when the core is nearest the end of coil opposite the clip end. Repeat steps 2 and 3.
4.	"	"	45.3MC	"	"	A4	Adjust for maximum deflection. Use peak nearest clip end of coil.
5.	"	"	47.25MC	"	"	A5	Adjust for MINIMUM deflection. Repeat steps 4 and 5.
6.	"	"	45.3MC	"	"	A6	Adjust for maximum deflection. Use peak nearest clip end of coil.
7.	"	"	47.25MC	"	"	A7	Connect a clip lead across the 47.25MC trap coil of L12. Adjust for MINIMUM deflection. The correct null should occur when the core is nearest the end of coil opposite the clip end. Repeat steps 6 and 7.
8.	"	High side to point Ⓒ. Low side to chassis.	45.5MC (Unmod)	"	"	A8	Shunt L9 with a 100Ω resistor in series with a .001 MFD capacitor. Adjust A8 for maximum deflection. Remove 100Ω resistor and .001MFD capacitor from L9.

OVERALL VIDEO IF RESPONSE CHECK

Leave bias connected as under "Video IF Alignment". Use only enough sweep and marker generator output to provide useable indication on scope.
Set contrast control for minimum.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Direct	High side to an ungrounded tube shield floating over converter tube. Low side to chassis.	44MC (10MC Swp)	41.25MC 42.25MC 45.25MC 47.25MC	Any non-interfering channel	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.		Check for response similar to Fig. 1. If necessary SLIGHTLY retouch A1, A2, A4, A6 and A8 to obtain desired response. Adjust A3 so that 41.25MC marker falls in center of trap notch. Adjust A5 and A7 to place 47.25MC marker in center of trap notch. Increase sweep generator and scope output to observe trap notches.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	.01MFD	High side to pin 7 (grid) of 6AW8 (V6A). Low side to chassis.	Not used	4.5MC (400∿Mod)	Any non-interfering channel	Vert. Amp. thru detector (Fig.2) to pin 11 (cathode) of picture tube. Low side to chassis.	A9	Set contrast control for maximum. Adjust for MINIMUM 400∿ indication on scope.

SOUND IF ALIGNMENT USING ON THE AIR SIGNAL

Remove the bias battery. Turn set on and tune in a strong TV signal. Turn the buzz control (R10) 90° from maximum clockwise position. Adjust A12 for maximum volume. Reduce the signal strength into the receiver by inserting an attenuator in series with the antenna and receiver antenna terminals. If a suitable attenuator is not available, remove the antenna terminals and stray feed the signal into the receiver by placing the antenna near the antenna terminals. Adjust A10 and A11 for maximum volume. Adjust R10 for minimum noise. Reconnect antenna and readjust A12 for maximum volume. If necessary, reduce volume so that the peak can be heard.

ALTERNATE SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR, FM SIGNAL GENERATOR AND OSCILLOSCOPE

Set volume control at low volume level.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	.01MFD	High side to pin 7 (grid) of 6AW8 (V6A). Low side to chassis.	4.5MC (400∿Mod) (50KC Swp)	4.5MC	Any non-interfering channel	Across secondary of audio output transformer.	A12	Set buzz control (R10) 90 degrees from maximum clockwise rotation. Adjust A12 for maximum 400∿ indication on scope.
12	"	"	"	"	"	"	A10, A11	Attenuate generator output so that signal level is below the limiting level of the 3BN6 as evidenced by background hiss or noise. Adjust A10 and A11 for maximum response on scope.
13.	"	"	Not used	4.5MC (400∿Mod)	"	"	R10	Use high signal generator output and adjust R10 for MINIMUM 400∿ indication on scope.
14.	"	"	4.5MC (400∿Mod) (50KC Swp)	4.5MC	"	"	A12	With volume control at low level retouch A12 for maximum 400∿ indication on scope.

ALIGNMENT INSTRUCTIONS (cont)

OSCILLATOR ALIGNMENT FOR CHASSIS 466 ONLY

Leave the bias connected as under "Video IF Alignment".
The channel oscillator adjustment screws are reached thru a hole just above and to the left of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	57MC (10MC Swp)	55.25MC 59.75MC	2	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A13	Adjust to place sound marker in trap notch as in Fig. 3. Video marker should fall at 40% on high frequency slope of response curve.
			63MC (10MC Swp)	61.25MC 65.75MC	3		A14	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A15	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A16	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A17	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A18	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A19	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A20	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A21	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A22	
			207MC (10MC Swp)	205.25MC 209.75MC	12		A23	
			213MC (10MC Swp)	211.25MC 215.75MC	13		A24	

RF AND MIXER ALIGNMENT FOR CHASSIS 466 ONLY

The RF and Mixer portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion is not recommended in the field.

VHF OSCILLATOR ADJUSTMENT FOR CHASSIS 467 ONLY

Set the fine tuning control to the center of its range. This is indicated by the slot in the shaft being parallel to the top side of tuner.
Set the channel selector to the highest high band channel (7-13) station operating in the area. Adjust the high band oscillator adjustment (A25) for best picture detail.
Set the channel selector switch to the highest low band channel (2-6) station operating in the area. Adjust the low band oscillator adjustment (A26) for best picture detail.

VHF RF AND MIXER ALIGNMENT FOR CHASSIS 467 ONLY

The RF and Mixer portions of this tuner have been properly aligned at the factory and are very stable. Alignment of this portion is not recommended in the field.

UHF TUNER ALIGNMENT

In the event UHF oscillator tube is replaced, it is recommended that several tubes be tried and the one which works best should be used. Alignment of the tuner should not be required in the field.

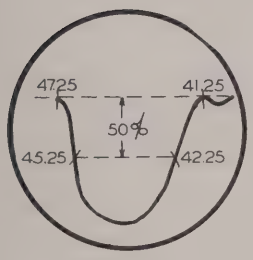


FIG. 1

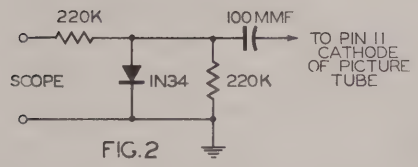


FIG. 2

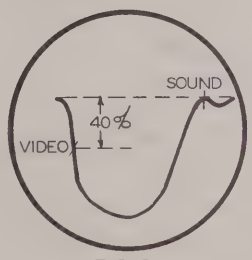


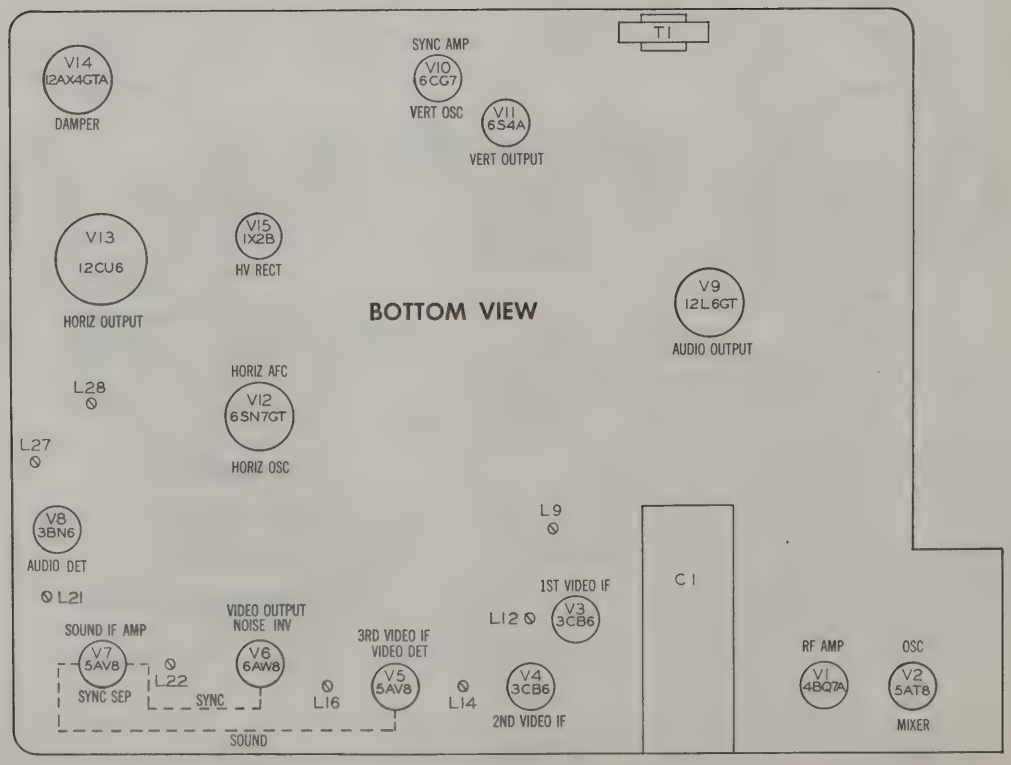
FIG. 3

PROPERTY OF
F. BLANKENSHIP
3924 MEADE ST
DENVER, COLORADO

RESISTANCE MEASUREMENTS

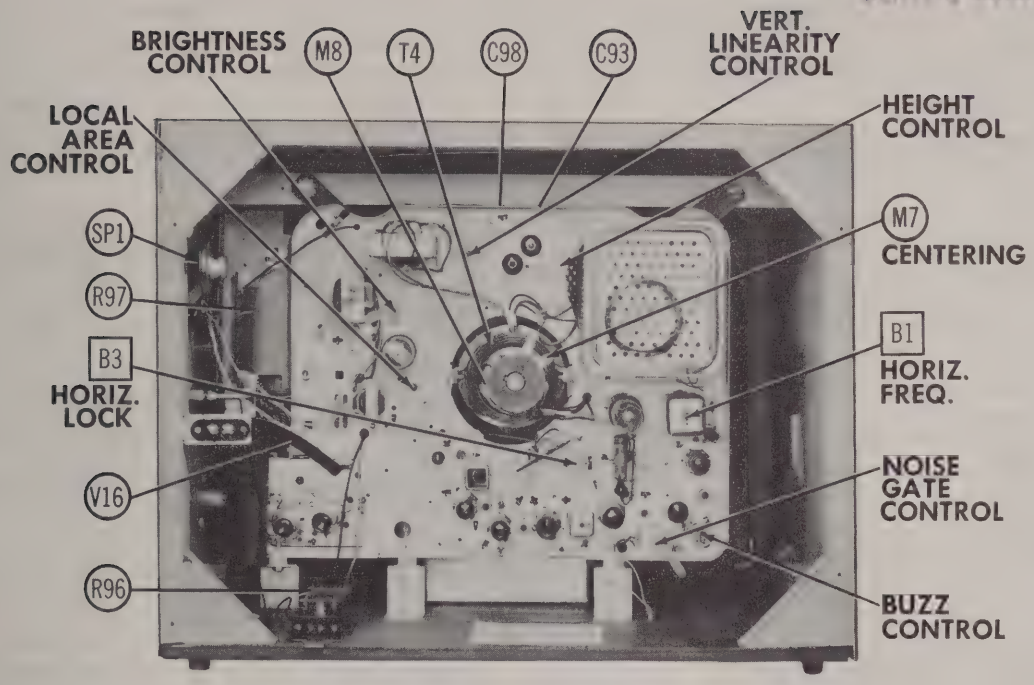
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	4BQ7A	INF	1Meg	0Ω	2Ω	0Ω	■12KΩ	320KΩ	INF	320KΩ
V 2	5AT8	10KΩ	■4. 9KΩ	0Ω	3Ω	2Ω	■16KΩ	■47KΩ	0Ω	220KΩ
V 3	3CB6	800KΩ	47Ω	18Ω	17Ω	■1KΩ	■1KΩ	0Ω		
V 4	3CB6	680KΩ	56Ω	17Ω	16Ω	■1KΩ	■1KΩ	0Ω		
V 5	5AV8	. 2Ω	4. 5KΩ	4. 5KΩ	15Ω	16Ω	470Ω	150Ω	■2KΩ	■1KΩ
V 6	6AW8	3. 3KΩ	1. 8Meg	†27KΩ	13Ω	15Ω	350Ω	1Meg	†30KΩ	†4. 7KΩ
V 7	5AV8	0Ω	2. 2Meg	■1Meg	13Ω	12Ω	. 9Ω	150Ω	■18KΩ	■18KΩ
V 8	3BN6	250Ω	3. 5Ω	12Ω	11Ω	■5. 6KΩ	4. 8Ω	†400KΩ		
V 9	12L6GT	TP	21Ω	†250Ω	†60Ω	230KΩ	TP	18Ω	20KΩ	
V 10	6CG7	▲2. 5Meg	420KΩ	60Ω	19Ω	7Ω	■11. 5KΩ	22KΩ	0Ω	0Ω
V 11	6S4A	NC	6. 5KΩ	▲2. 5Meg	4Ω	7Ω	▲2. 5Meg	NC	NC	▲1. 1KΩ
V 12	6SN7GT	750KΩ	†80KΩ	300KΩ	250KΩ	†40KΩ	0Ω	10Ω	11Ω	
V 13	12CU6	TP	23Ω	TP	†8. 2KΩ	470KΩ	TP	21Ω	0Ω	TOP CAP ▲47Ω
V 14	12AX4GTA	NC	NC	450KΩ	NC	†60Ω	TP	23Ω	26Ω	
V 15	1X2B		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲445Ω
V 16	21ATP4	3Ω	56KΩ	PIN 6 20KΩ	PIN 10 ▲220KΩ	PIN 11 ■360KΩ	PIN 12 4Ω			

■MEASURED FROM 135 V LINE.
†MEASURED FROM OUTPUT OF M2.
▲MEASURED FROM PIN 3 OF V14.
TP-TIE POINT.
NC-NO CONNECTION.
ALL MEASUREMENTS TAKEN WITH AREA SELECTOR SWITCH IN "LOCAL" POSITION.



TUBE PLACEMENT CHART

PROPERTY OF
L. F. ELSWICK-CP
DENVER, COLORADO



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set contrast control for normal.

1. Pre-set the horizontal lock trimmer (B3) one-half turn from maximum clockwise position.

2. Set the horizontal hold control to its mid-range position and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

3. Connect the vertical amplifier of the oscilloscope thru 10MMF to lug 4 of L28. Low side to chassis. Adjust the horizontal waveform slug (B2) until waveform similar to Fig. 4 is obtained. While making this adjustment keep the picture in sync with the horizontal hold and if necessary, B1 and the horizontal lock trimmer (B3).

4. Turn the horizontal hold fully clockwise. Turn B1 counter clockwise until the picture just loses sync, then turn B1 clockwise until picture is just ready to pull into sync.

5. Turn the horizontal hold control fully counter clockwise. Picture should remain in sync. Momentarily remove signal by switching off channel and back again. If more than seven diagonal bars are present, adjust B3 slightly counter clockwise until 3 or 4 diagonal bars appear when switching off channel and back again. If less than 3 bars are present when switching off channel and back again, adjust B3 slightly clockwise until 3 or 4 bars are present when switching off channel and back again. Repeat steps 4 and 5 until the effective pull-in range of the horizontal hold control in from 60 to 120 degrees.

6. In weak signal areas the horizontal hold control should be adjusted so that when switching on and off chanel the picture returns completely in sync.

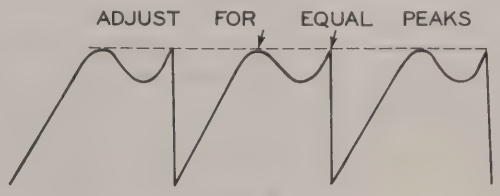


FIG. 4

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V13 and V14. Check M1 and M2. Check C82, C83, C84, R94, T2, T4A and other associated components.

DRIVE LINES

Check by substitution V13 and V14. Check C82, C83, T2, T4A, R94 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V13 and V14. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V12, V13 and V14. Check C79 and C78 for open. Check L28, R85, R88, R2 and other associated components.

XMAS TREE EFFECT

Check by substitution V12, V13 and V14. Check T2 and T4 for internal arcing. Check L28, C76, C80, C81, C83, R89, R82 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V10 and V11. Check waveform W7.

If Satisfactory	If Unsatisfactory
Check T3, T4B, C5, C6, R74, R75 and other associated components.	Check T1, C70, C71, R72, R6, and other associated components.

INSUFFICIENT SWEEP

Check by substitution V10 and V11. Check height and vertical linearity controls for proper operation. Check R72, T3 and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V10 and V11. Check C70, C71, R72, R6, R48, T1, T3 and other associated components.

COMPRESSED AT TOP

Check by substitution V10 and V11. Check R74, R75, R5, R76, C6, T3, T4B and other associated components.

FOLDS

Check by substitution V10 and V11. Check C71, T1, T3, T4B, R74, R75 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V7 and V10. Check C65, C66, C67, R66, R69, R70 and other associated components.

LOSS OF VERTICAL SYNC - HORIZONTAL SYNC SATISFACTORY

Substitute V10. Check vertical integrator network. Check C69, C70, R1, and other associated components.

LOSS OF HORIZONTAL SYNC - VERTICAL SYNC SATISFACTORY

Substitute V12. Check C75, C76, C78, C79, R2 and other associated components.

HORIZONTAL BENDING

Check by substitution V7, V10 and V12. Check components associated with V12.

VIDEO

LOSS OF VIDEO

Substitute V6. Check C47, C48, C49, C51, C2B, R44, R45, R46, L23 and other associated components.

SOUND BARS (4.5 BEAR)

Adjust tuner fine tuning for best sound and picture. Check adjustment A9. Check video IF Alignment.

POOR CONTRAST

Substitute V6. Check L20, L21, L24, L25, C47, C51, R46 and other associated components.

NEGATIVE PICTURE

Substitute V6. Check picture tube. Check C47, C51, R44, R46 and other associated components.

SMEAR

Substitute V6. Check L17, L18, L19, L20, L21, L24, L25, C47, C51 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V4 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V7, V8 and V9. Check stage V9 using audio signal generator. Apply audio signal across C58.

If Satisfactory	If Unsatisfactory
Check audio detector and Sound IF stages for component failure or change of value.	Check C58, C59, C60, C2C, R55, R56, R57, R58, T5 speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustments A12 and R10 for minimum buzz. If still unsatisfactory, check Sound IF alignment.

DISTORTED

Follow procedure outlined under "Weak or no Sound".

POWER

DEAD SET

If filaments fail to light, check all tubes. These tubes are connected in series. Check AC interlock assembly. Check switch on volume control and R97. If filaments light, check M1, M2, R96 and C1. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Check M1, M2, C1 and R96. Check B+ filter and decoupling network.

TROUBLE SHOOTING AIDS (cont)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V12, V13, V14 and V15. Check waveform W12.

If Satisfactory	If Unsatisfactory
Check T2, T4A, C84, C85, C86, R94 and other associated components.	Check L28, C77, C80, C81, C82, C83, R2, R82, R83, R89 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V13 and V14. Check M1 and M2. Check C82, C83, C1, R94, R96, T2, T4A and other associated components.

BLOOMING

Check by substitution V13, V14 and V15. Check M1 and M2. Check C83, C1, R94, R95, R96, T2, T4A and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or no Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5, V6 and V9. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

KEYSTONE EFFECT

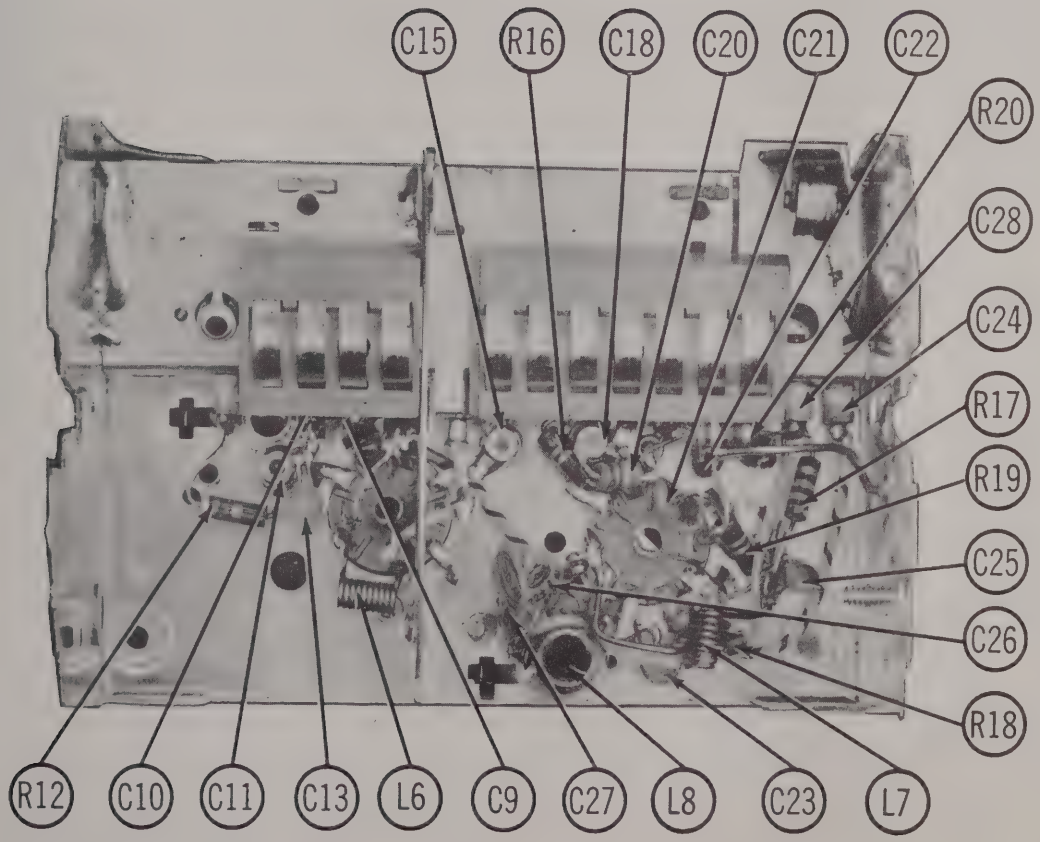
Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



RF TUNER BOTTOM VIEW

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet to the right of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 3 wood screws holding metal strip at the bottom of the safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

(See tube placement chart on page 5).

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to set. Adjustment is located on top of chassis. Set the horizontal hold control at the center of its range and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, it is necessary to remove the rear cover and supply power to set. Adjust the buzz control for maximum volume and minimum buzz. (See Tube Placement Chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

REMOVAL OF CABINET FROM MOUNTING BOARD

1. Remove 7 push-on type control knobs from side panel of cabinet.
2. Remove 6 wood screws. Remove rear cover.
3. Disconnect speaker leads.
4. Remove 1 wood screw. Remove antenna bracket.
5. Remove 2 wood screws from inside rear corner braces that hold the cabinet to the cabinet base.
6. Remove 2 wood screws that hold the chassis to the wood strip on the inside of the cabinet above the chassis.
7. Remove 6 hex head bolts on the underside of chassis mounting board (along sides of the cabinet) and 1 wood screw at the bottom front center.
8. Lift cabinet straight up and off of mounting board.
9. Remove 2 speaker nuts. Remove speaker.

PROPERTY OF
F BLAKESHIP
3924 MEADE ST
DENVER, COLORADO

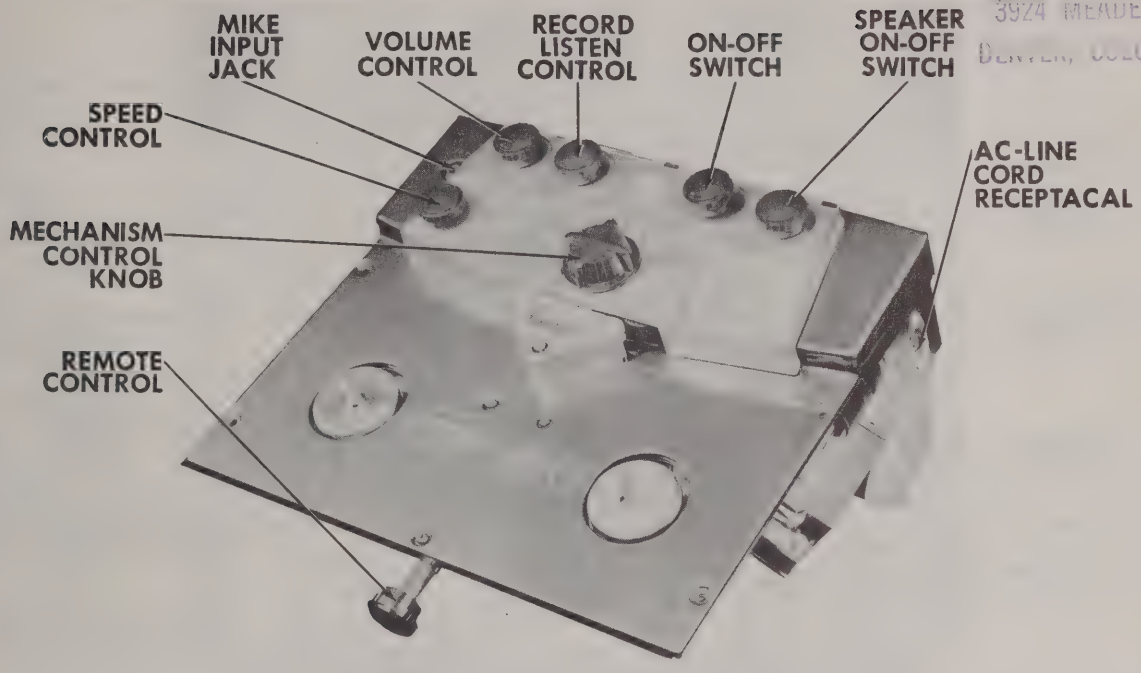


Figure 1

GENERAL INFORMATION

The Webster Electric Ekotape Recorder Model 212 is for custom installation and has no cabinet, or carrying case. The Model 212 is designed to record and play back two tracks of material on standard width recording tape, which doubles the playing time of a standard 5" or 7" reel of tape with no loss of frequency response or quality. Recording can be made from a radio, television receiver or phonograph, in addition to those made directly from the microphone.

The Model 212 has two tape speeds, 3 3/4" and 7 1/2" per second. Using both tracks of the tape, recording time is as follows:

Size Reel	3 3/4"Speed	7 1/2"Speed
5"	1 hour	1/2 hour
7"	2 hours	1 hour

This unit is designed to operate on 60 cycle, 115 volts, AC supply only. Before connecting to your line supply, be absolutely certain that it agrees with the above specifications.

Manufactured by:

Webster Electric Company
Racine, Wisconsin

This material compiled and published by

HOWARD W. SAMS & CO., INC., INDIANAPOLIS, INDIANA

Copyright 1955 • All Rights Reserved

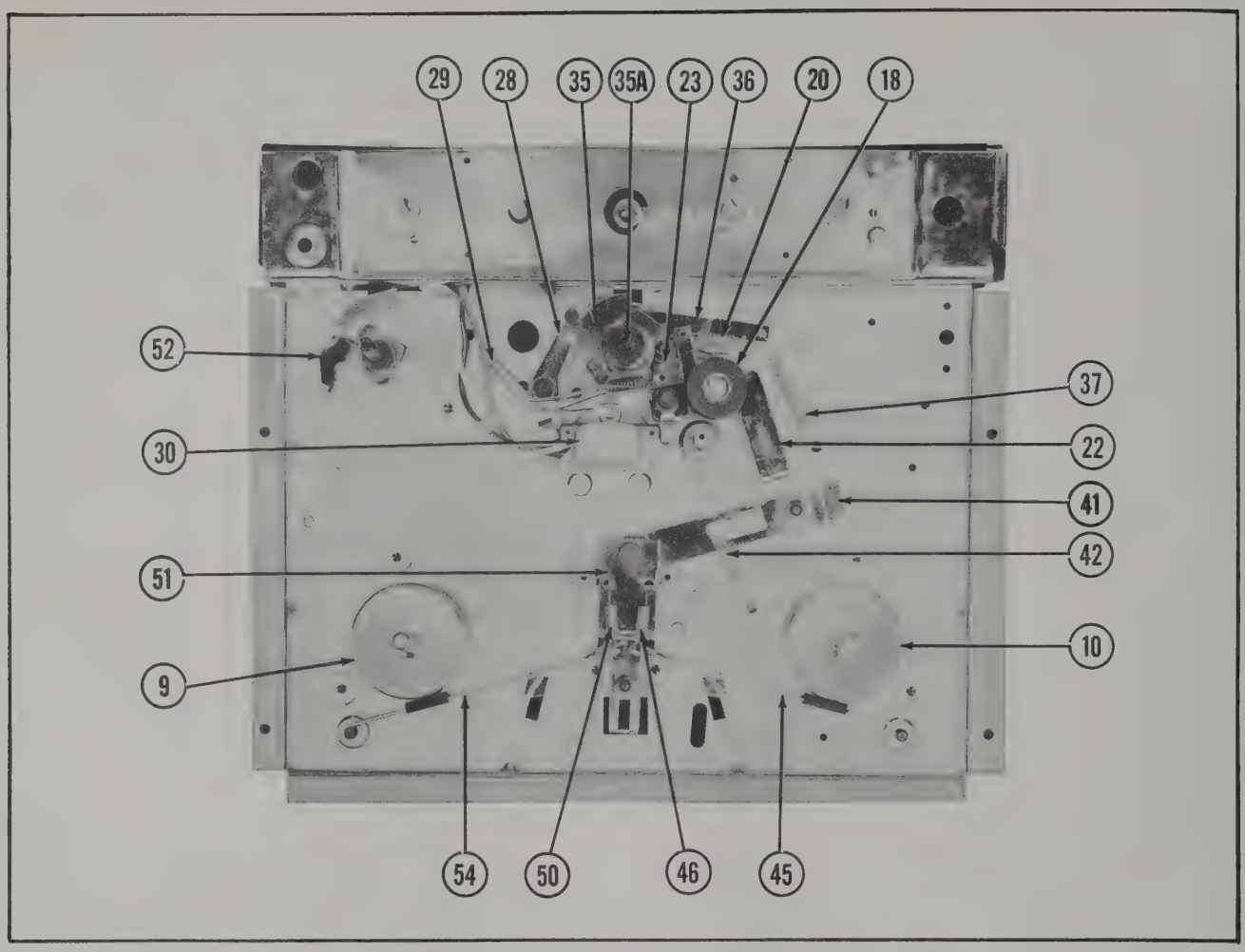


Figure 2

OPERATING INSTRUCTIONS

Preparing The Ekotape For Recording-

1. Insert the AC power cord into the receptacle on the right side of the unit.

2. Plug the AC cord into a convenient wall receptacle of the proper rating.

3. Place a reel of tape on the left hand or "supply" spindle (9) in a manner so that the tape will unwind in a clockwise direction.

NOTE: The Ekotape is designed to use Type "A" wound tape, i.e. the dull magnetic coated side faces inward on the reel. If the tape used is Type "B" (coated side facing outward) the recording will be made at a very low sound level and the playback will be almost inaudible.

4. Place an empty reel on the right hand or "take-up" spindle.

5. Unwind approximately 10" of tape and, while holding a section of tape straight with both hands, insert the tape in the tape slot making sure the dull coated side of the tape faces the front of the recorder.

6. Insert the free end of the tape through to the hub of the "take-up" reel, forcing it into one of the three radial slots. While holding the tape in this position, turn the reel several turns (clockwise) until the tape is secured to the reel and all slack is taken up between reels.

To Make A Recording-

1. After the recording tape has been properly threaded, turn the "On-Off" control to the "On" position.

2. Turn the mechanism control knob (2) to "Forward".

3. Turn the "Record-Listen" selector knob to the "Record" position.

NOTE: The "Record-Listen" selector knob will stay in the "Record" position only when the mechanism control knob (2) is in the "Forward" position.

4. Turn the "Volume" control clockwise until the incoming signal causes the "Record Indicator" to flicker occasionally. A recording is now being made on the tape.

To Record From Microphone-

1. Insert the microphone plug into the "Mic." jack, located on the left side of the top panel.

2. Follow the instructions under the heading of, "To Make A Recording".

3. Best results will be obtained if the microphone is kept closer to the source of sound than to any walls in the recording area to prevent echos of the sounds as they rebound off the walls.

NOTE: The microphone should be kept at least three feet away from the loudspeaker during recording unless the "Speaker" control knob is in "Off" position.

To Record From Radio Or Television Receiver-

Recordings can be made from a radio or television receiver by placing the microphone near the loudspeaker; however, this type of recording may not be satisfactory as other sounds may be picked up by the microphone which as a result may be recorded on the tape. A superior quality recording can be made by use of Radio Cord Attachment. Connect attachment cord as follows:

1. Connect the cord clips across the voice coil terminals on the radio or television speaker.

2. A terminal strip marked Rad-Pho- Input is provided on the bottom of the chassis, and the other end of cord should be connected here.

3. Set the radio or television receiver for soft playing, then operate the Ekotape controls as described under "To Make A Recording".

To Record From Phonograph-

1. Connect the alligator clips of the Radio Cord Attachment to the ends of the pickup leads of the phonograph and then connect the other end to the terminal marked Radio-Pho-Input. Proceed with the recording as described under "To Make A Recording".

NOTE: Should a hum develope from the above connections, reverse the cord clips on the pickup leads.

To Rewind-

Turn the mechanism control knob (2) counter-clockwise into the "Rewind" position. When the rewinding is completed move the mechanism control knob (2) into "Stop" position and allow the tape to come to a complete stop before moving the mechanism control knob to any other function.

Twin Track Operation-

Model 212 is a twin-track unit, which records on approximately half the width of the tape at one time.

1. To record a second program on the same tape, lift the full reel from the right hand spindle, turn it over, and place it on the left hand spindle.

2. Place the empty reel on the right hand spindle; properly thread the tape, and continue your recording as described under "To Make A Recording".

NOTE: Since it is impossible to edit and splice one "track" without affecting the other, recordings which are to be edited should be limited to one track only.

To Play A Recording-

1. With the tape properly threaded, turn the mechanism control knob (2) to the "Forward" position.

2. Adjust the "Volume" and "Tone" controls to suit.

3. Be sure the speaker "On-Off" switch, located on the right side of the top panel, is in the "On" position.

Fast Forward-

If it is desired to reach a recording near the end of a tape in a few seconds, turn mechanism control knob (2) to the "Fast Forward" position. In the "Fast Forward" position the tape moves ahead approximately 15 times normal listening speed of 3 3/4 or 7 1/2 inches per second. The most rapid fast forward speed is therefore obtained with the speed control set at 7 1/2.

REMOVING UNIT FROM MOUNTING BOARD

All service work with the exception of cleaning the head assembly, adjustment or replacement of brake lever assemblies (45 and 54), remote lever assembly (51), pinch roller and lever assemblies (22), (23) and (18), pressure pad assembly (28), will require removal of unit from the mounting board.

1. To remove the back cover (5) for cleaning of the head remove all control knobs, and remove two screws located under mechanism control knob (2). Move back cover (5) about 1/16 inch toward the front of the unit and lift straight up and off.

2. To remove record head cover (7), remove one attaching screw and lift off.

3. For removal of the top panel assembly (13), follow the above instructions and remove seven screws on panel and two under back cover (5). Lift panel straight up and off.

4. To remove recorder from mounting board, omit paragraph 1, 2 and 3, detach the AC line cord, remove two screws located on each side of the top panel. Carefully lift unit straight up and out, detaching all leads, and other connections to the amplifier. Make sure unit is completely free of the amplifier.

5. When reassembling the unit, reverse the above procedure; plug the amplifier leads into the unit as marked on the bottom of the unit. Be sure that all leads clear all moving parts before lowering into place.

PROPERTY OF
L. F. BLANKENSHIP
3924
DENVER, COLO.

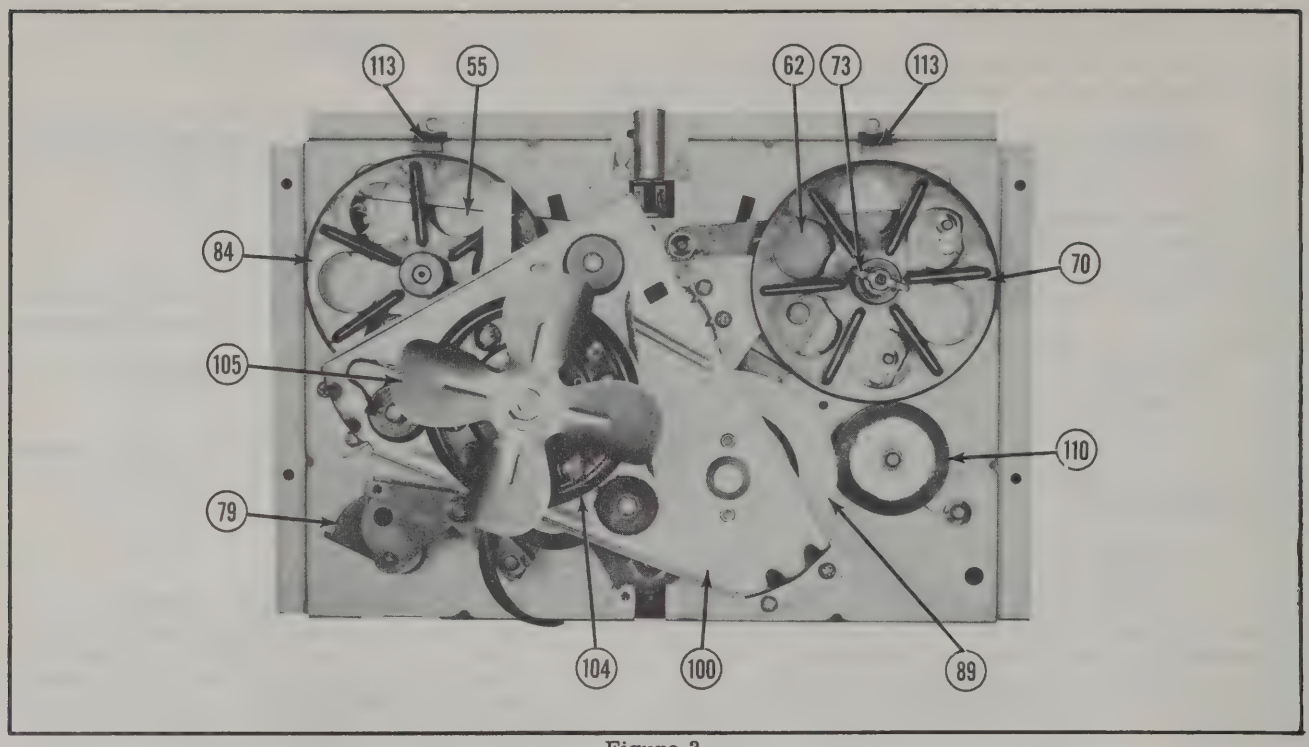


Figure 3

TROUBLES AND REMEDIES

Motor Or Amplifier Inoperative When On-Off Control Switch Is Turned On-

1. Check to see if power is reaching recorder.

2. Damaged power cord.
ⓐ Repair or replace.

3. Damaged "On-Off" control switch.
ⓐ Replace "On-Off" control switch assembly.

4. Defective power transformer, or rectifier tube, will cause the amplifier to be inoperative.
ⓐ Replace power transformer, or rectifier tube.

Sound Is Fuzzy, Faint, Distorted, Or No Sound-

1. Dirty head.
(a) Check the record head (30) to see if it is dirty. The recording head is subject to an accumulation of tape coating residue, which is worn off the tape as it passes the head. This should be periodically removed since it may cause faint recordings and poor playback. Wipe off the record and erase head contact surfaces carefully with a clean cloth. If dirt is caked or hard and will not come off with a dry cloth, dampen the cloth slightly with carbon tetrachloride.

NOTE: Do not use a brush or excessive amount of solvent on the head surfaces.

2. Over recorded or under recorded tape.
(a) Correct recording volume is very important. Too weak a signal, which does not cause the record level indicator to flicker, will result in weak playback and high background noise. Too strong a signal, causing the indicator to glow continuously, will result in distortion during playback.

3. Amplifier trouble.

4. Worn or dirty pressure pad. See "Pressure Pad And Lever Adjustments".

5. Pressure pad spring (29) loose or missing.
(a) The pressure pad lever assembly (28) should apply pressure against the tape, thus holding the tape firm against the recording head. If this is not true, check the pressure pad spring (29); if loose or missing, replace.

Erasing Incomplete Or No Erase-

1. Dirt on face of play-record head.
(a) Clean with soft cloth and carbon tetrachloride.

2. Oscillator coil assembly or tube not operating.
(a) Check erase voltage with an AC vacuum tube voltmeter. There should be a reading of approximately 45 volts.

3. Defective erase coil in head.
(a) Check erase head continuity.

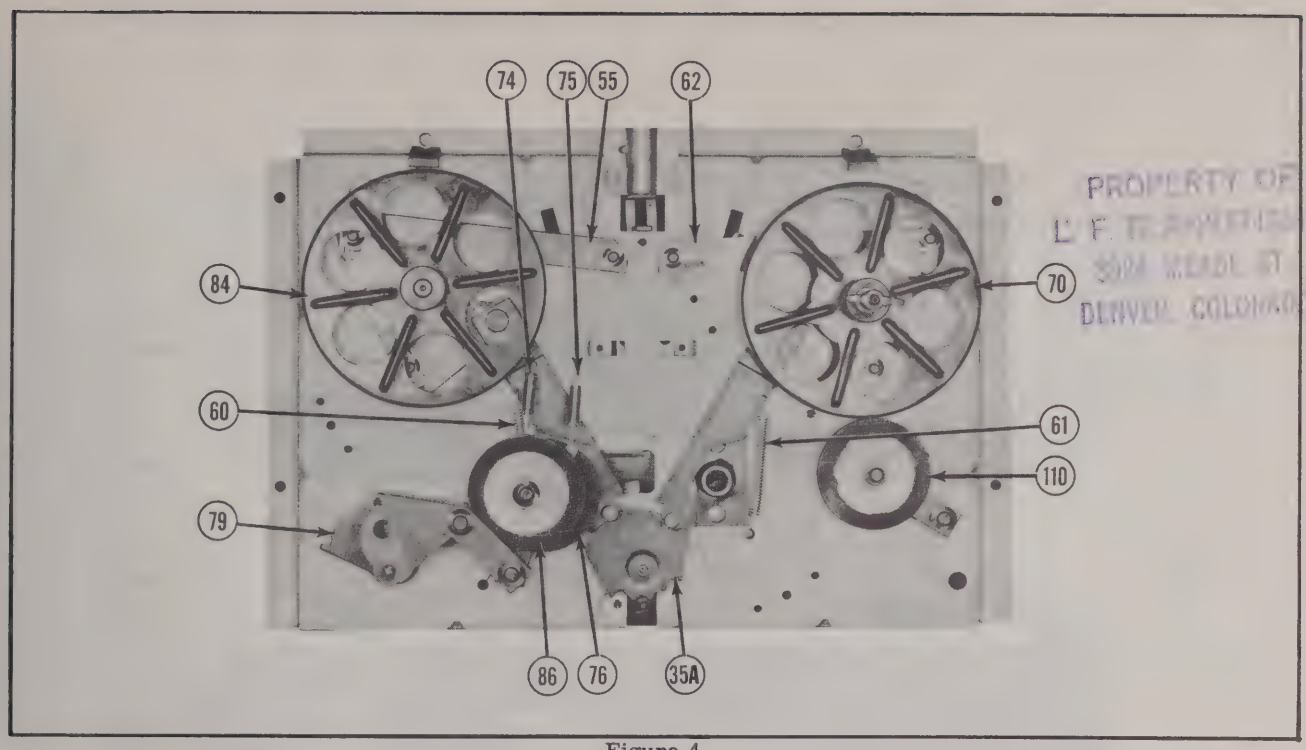
4. Pressure pads worn or not properly adjusted. See "Pressure Pad And Lever Adjustments".

Failure To Record-

1. Record coil open.
(a) Replace play-record head (30).

2. Insufficient bias voltage.
(a) Check bias voltage across play-record head with an AC vacuum tube voltmeter. There should be a reading of approximately 100 volts.

3. Dirt on face of play-record head.
(a) Clean with soft cloth and carbon tetrachloride.



PROPERTY OF
L. F. TECHNOLOGY
5004 KEARNEY ST
DENVER, COLORADO

Figure 4

4. Pressure pad worn, defective or not properly adjusted.
   (a) Adjust pressure pad or replace. See "Pressure Pad And Lever Adjustments".

Will Not Play Back-

1. Open coil in play-record head.
   (a) Replace head.

2. Open input circuit.
   (a) Check circuit.

Howl Or Ringing Sound-

1. Microphonic tube.
   (a) Replace defective tube.

Trouble Common To Radio Receivers-

1. Defective components.
   (a) Check and replace in accordance with standard practice.

Rewind Inoperative, Noisy Or Irregular-

1. Defective motor pulley assembly (94).
   (a) Replace.

2. Supply reel shaft support assembly (55), dirty or defective.
   (a) Clean, lubricate or replace.

3. Supply reel support spring (60) is broken.
   (a) Replace.

4. Brake (45) dragging on take-up reel.
   (a) Adjust brakes. See "Adjusting Brake Lever Assembly".

Tape Overruns From Rewind To Stop-

1. Take-up reel brakes (45) not functioning properly, worn or improperly adjusted.
   (a) Replace or readjust. See "Adjusting Brake Lever Assembly".

Take-Up Or Fast Forward Inoperative, Noisy Or Irregular Drive-

1. Take-up clutch worn or out of adjustment.
   (a) Adjust or replace. See "Correcting Take-Up And Fast-Forward Troubles".

2. Drive pin (67) missing.
   (a) Replace.

3. Brakes dragging on supply reel.
   (a) Adjust brakes. See "Adjusting Brake Lever Assembly".

4. Take-up reel support plate (62) dirty or damaged.
   (a) Clean, lubricate or replace. See "Correcting Take-Up And Fast-Forward Troubles".

5. Noisy, take-up or fast forward.
   (a) Clean, lubricate or replace.

6. Defective idler wheels (76 or 86).
   (a) Replace. See "Correcting Take-Up And Fast-Forward Troubles". (Paragraph 4).

7. Reel take-up support plate spring (61) broken.
   (a) Replace.

Tape Overruns From Fast Forward To Forward Position-

1. Supply reel brakes not functioning properly, worn or out of adjustment.
   (a) Replace or readjust. See "Adjusting Brake Lever Assembly".

2. Pinch roller (18) damaged or out of adjustment.

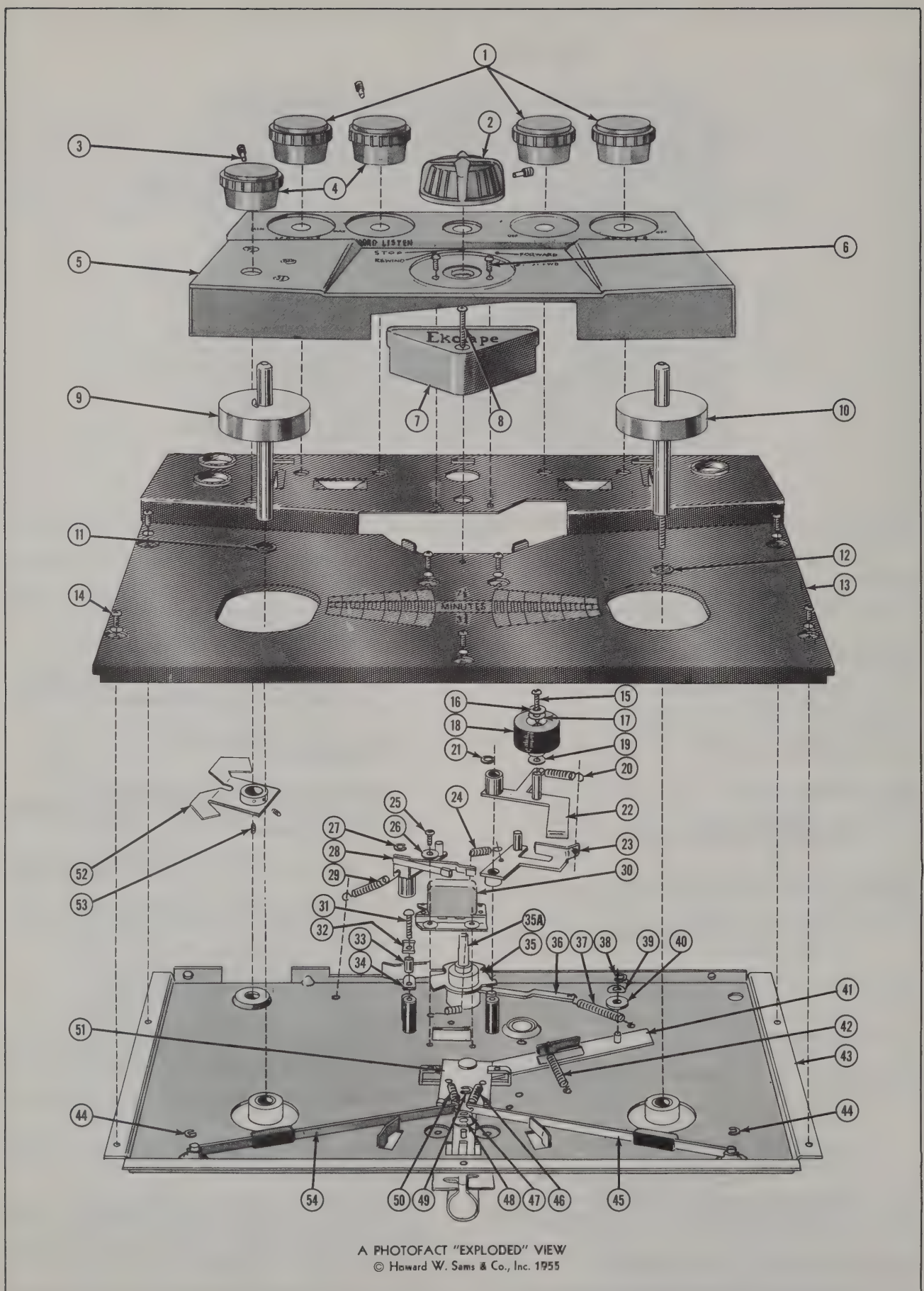
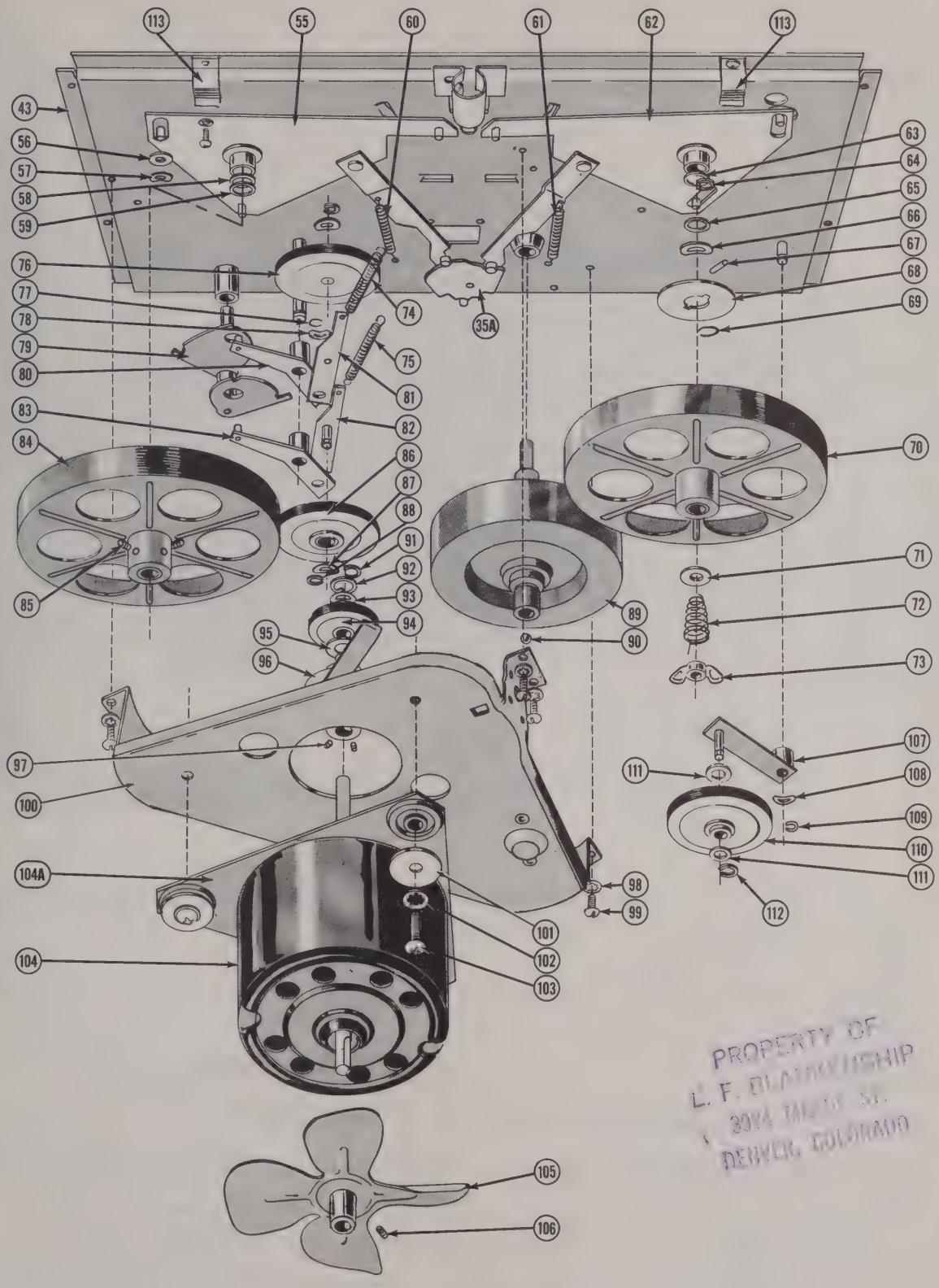


Figure 5A. Exploded View Of Parts Above Baseplate.



A PHOTOFACT "EXPLODED" VIEW
© Howard W. Sams & Co., Inc. 1955

PROPERTY OF
L. F. BLAIRSHIP
3974 MACON ST.
DENVER, COLORADO

Figure 5B. Exploded View Of Parts Below Baseplate.

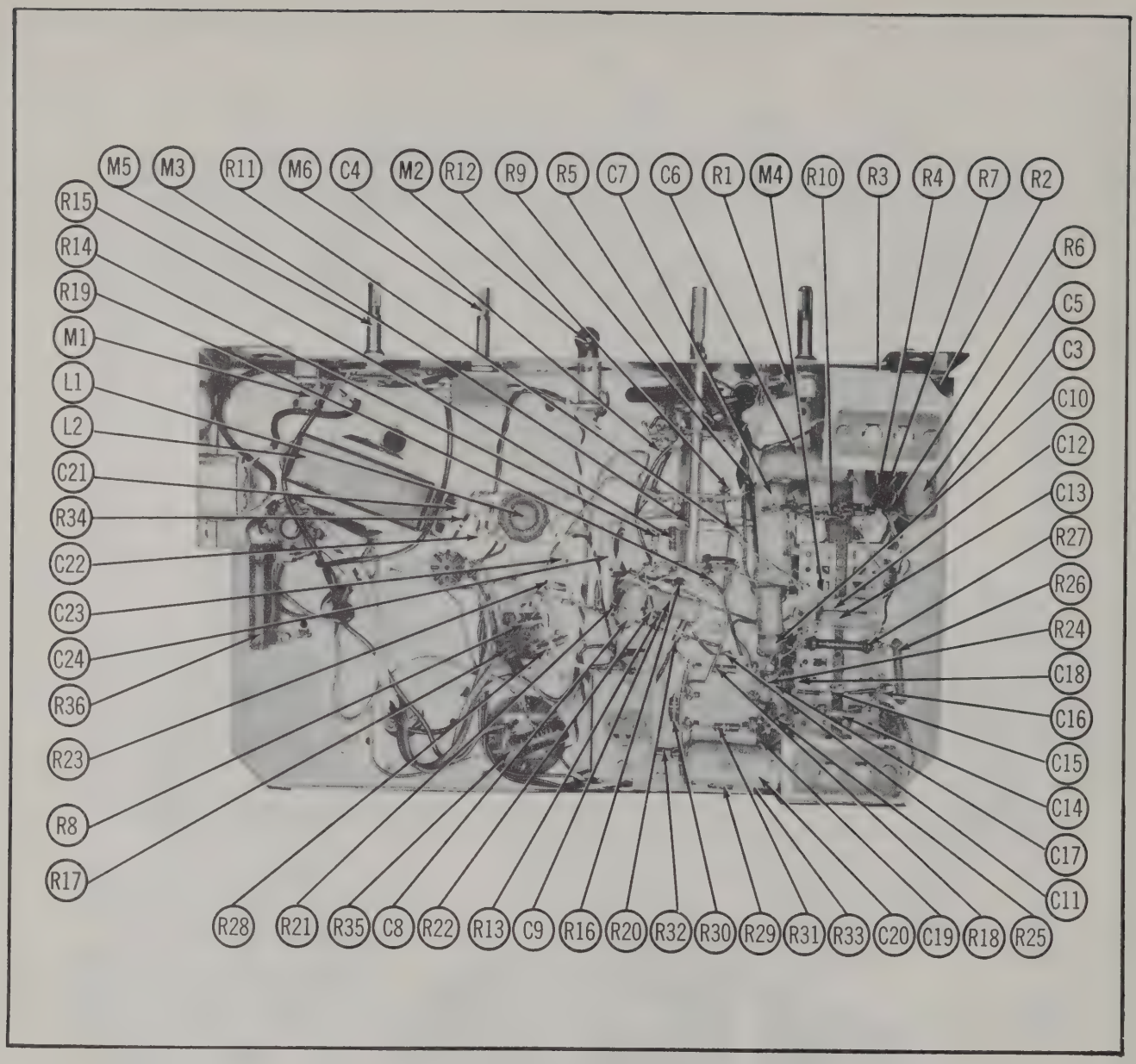


Figure 6

(a) Repair or replace. See "Pinch Roller Adjustment".

Noisy Running In Stop And Forward Positions-

1. Defective idlers, dry bearings or flat spots on idlers.
   (a) Clean, lubricate or replace. See "Correcting Take-Up And Fast-Forward Troubles".

Tape Spills Out Of Supply Reel From Stop To Forward Position-

1. Dirty or defective pinch roller (18).
   (a) Clean, lubricate or replace. See "Correcting Take-Up And Fast-Forward Troubles".

2. Pinch roller lever assemblies (22 and 23) out of adjustment or damaged.
   (a) Adjust or replace. See "Pinch Roller Adjustment".

Mechanism Control Knob (2) Inoperative-

1. Loose set screw in knob.
   (a) Tighten.

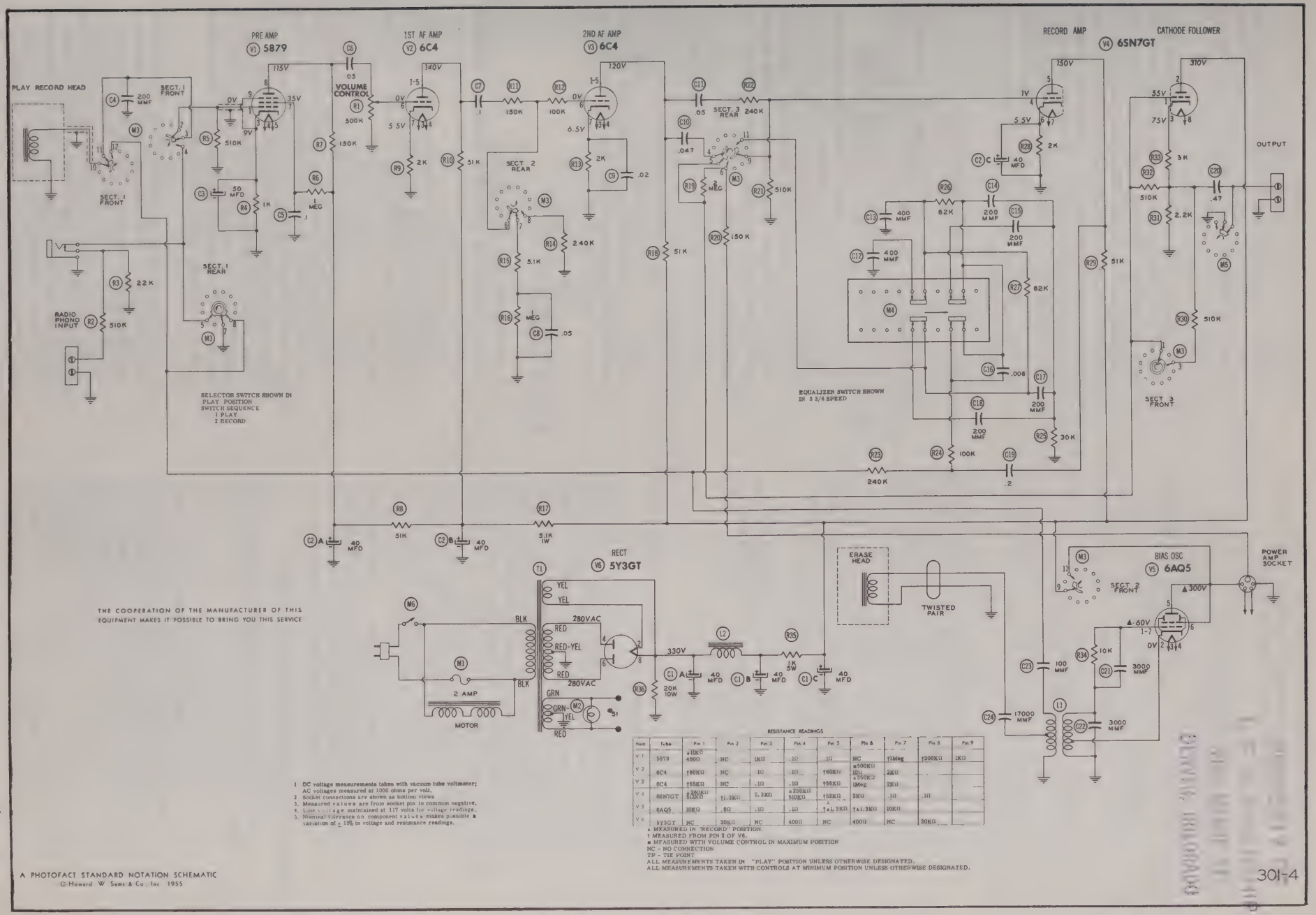
2. Loose set screws in pinch roller cam assembly (35).
   (a) Adjust and tighten.

Speed Selector Not Functioning-

1. Broken springs (74 and 75) on drive idler assemblies.
   (a) Replace.

Speed Equalization Switch Not Functioning-

1. Switch cam assembly (52) loose or broken.
   (a) Tighten or replace.



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	5879	▲1MΩ 400Ω	NC	1KΩ	.1Ω	.1Ω	NC	†1Meg	†200KΩ	1KΩ
V 2	6C4	†60KΩ	NC	1Ω	.1Ω	†60KΩ	■500KΩ 10Ω ▲350KΩ	2KΩ		
V 3	6C4	†55KΩ	NC	.1Ω	.1Ω	†55KΩ	1Meg	2KΩ		
V 4	6SN7GT	▲250KΩ 510KΩ	11.3KΩ	5.2KΩ	▲250KΩ 510KΩ	†52KΩ	2KΩ	.1Ω	.1Ω	
V 5	6AQ5	10KΩ	.8Ω	.1Ω	.1Ω	†▲1.3KΩ	†▲1.3KΩ	10KΩ		
V 6	5Y3GT	NC	20KΩ	NC	400Ω	NC	400Ω	NC	20KΩ	

▲ MEASURED IN "RECORD" POSITION.
† MEASURED FROM PIN 2 OF V6.
■ MEASURED WITH VOLUME CONTROL IN MAXIMUM POSITION
NC - NO CONNECTION
TP - TIE POINT
ALL MEASUREMENTS TAKEN IN "PLAY" POSITION UNLESS OTHERWISE DESIGNATED.
ALL MEASUREMENTS TAKEN WITH CONTROLS AT MINIMUM POSITION UNLESS OTHERWISE DESIGNATED.

1 DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2 Socket connections are shown as bottom views
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W Sams & Co. Inc 1955

301-4

EKOTAPE
MODEL 212

2. Switch contacts worn, dirty or broken.
(a) Clean contacts or replace. See "Speed Equalization Switch Adjustment".

Machine Inoperative When Mechanism Control Knob Is Operated-

1. Damaged or worn cam and shaft assembly (35A).
(a) Replace.

ADJUSTMENTS

Pressure Pad And Lever Adjustments-

Cleaning, adjusting or replacing pressure pad assembly and lever assemblies should be done in the following manner:

1. To adjust pressure pad assembly (28), remove back cover (5) and top panel (13). To remove assembly for cleaning, repair or adjustment, remove spring (29) and retaining ring (27). Rotate the pressure pad assembly slightly counter-clockwise and lift off. Reassemble in reverse order and lubricate (see "Lubrication"). Adjust by turning cam and shaft assembly (35A) to "Forward" position and check to be sure pressure pads engage groove of head properly.

NOTE: Be sure flat of pad presses against the erase and record pole pieces. To adjust properly, bend levers accordingly.

Improper Rewind Operation-

If the unit does not perform the rewind operation properly, check as follows:

1. A defective motor pulley (94) may be the cause of improper rewind. To replace a defective motor pulley assembly, remove the three mounting screws (103) from motor and plate assembly (104). Carefully remove the assembly so as not to damage the drive idler assemblies (76 and 86). Before removing the motor pulley measure and note distance from hub to motor. Loosen the two Allen head set screws and remove the motor pulley assembly. Reassemble with a new pulley in reverse order. Be sure pulley hub is correct distance from motor as previously noted.

2. A dirty or defective supply reel shaft support assembly (55) may be responsible for improper rewind. To correct faulty operation, clean, repair or replace any damaged or worn parts.

Adjusting Brake Lever Assembly (45 and 54)-

If tape overruns from "Rewind" to "Stop" position, adjust, clean or replace brake lever assembly (45).

1. To adjust brake lever assembly (45), turn cam and shaft assembly (35A) to "Rewind" position. Adjust either by bending the brake lever assembly (45) or by slightly bending the stop on mechanism panel just enough to clear the cup disc on reel shaft (10). Clearance should not exceed 1/64 inch. Adjust brake lever (45) so that remote lever (51) returns to "Stop" position. Check to be sure brake lever (54) on the supply reel (9) is being held in its stop position by the remote lever assembly (51). If not, turn cam and shaft assembly (35A) to "Fast Forward" and adjust brake lever assembly (54) as outlined above. Before reassembly of top panel, thread recorder with tape and check unit for any further trouble.

2. If tape overruns from "Fast Forward" to "Forward", check operation of brake lever (54) as explained in above paragraph with this exception; turn cam and shaft assembly (35A) to "Fast Forward" position and adjust brake lever (54) on the supply reel (9). Check brake lever (45) on the take-up reel to be sure it is held in its stop position by the remote lever assembly (51). If not, turn cam and shaft assembly (35A) to "Rewind" and adjust brake lever as covered in above paragraph.

Adjusting Brake Arm Assembly (113)-

If after completing adjustments as covered in "Adjusting Brake Lever Assembly", the overrun on "Rewind" and "Fast Forward" is not corrected, remove the unit from the case and check as follows:

1. Check "Rewind" position first and adjust or replace brake arm assembly (113). First be sure brake pad is still attached to arm. Turn cam and shaft assembly (35A) to the "Rewind" position and adjust the brake arm (113) so pad just clears the reel pulley assembly (70) but by no more than 1/64 inch.

2. Check "Fast Forward" position and adjust or replace brake arm assembly (113). First be sure brake pad is still attached to arm. Turn cam and shaft assembly (35A) to "Fast Forward" position and adjust brake arm (113) so that the pad clears reel pulley assembly (84) by no more than 1/64 inch.

Correcting Take-Up And Fast Forward Troubles-

If take-up and fast forward drive does not function properly, remove unit from case and check as follows:

1. If the take-up or fast-forward drive is weak, screw the self-locking wing nut (73) on the reel shaft (10) so spring (72) will produce a greater friction drive.

2. If after adjusting the self-locking wing nut (73) a weak drive still exists, then remove wing nut, spring (72), washer (71) and reel pulley assembly (70) and check felt pad on pulley. If pad is worn badly, replace assembly (70), but if pad shows no excessive wear, remove clutch disc (68) and check to see if drive pin (67) is in place. Replace pin if missing and reassemble in reverse order and adjust wing nut.

3. If unit is noisy in "Forward" or "Fast-Forward" position, check to see if idler assembly (110) is dirty or damaged. Or it may be the result of dirty bearings on the take-up shaft or pulley assembly. To check, inspect idler assembly (110) and determine if dirty or defective. Remove retaining ring (112), fibre washer (111), idler assembly (110), and fibre washer (111). Clean any dirt or oil from idler tire and

bearing. Clean flywheel and shaft assembly (89), drive area only, also reel pulley (70) drive area with a suitable solvent. Relubricate idler bearing and reassemble in reverse order.

4. If noise still exists in "Forward" or "Fast-Forward" position check the reel shaft assembly (10). Remove wing nut (73) and spring (72), washer (71), reel pulley (70), clutch disc (68), pin (67), U-washer (66), washer (65), retaining ring (64), fibre washer (63), reel pulley assembly (10) and fibre washer (12). Clean and inspect all parts for wear or damage. Clean the bearing in the reel support assembly (62) and inspect bearing. Relubricate and replace any defective parts and reassemble in order shown on exploded view.

Pinch Roller Adjustment-

If pinch roller is damaged or out of adjustment, clean and adjust in the following manner:

1. To clean the follower lever assembly (23) and the pinch roller lever assembly (22), remove springs (20 and 24), and retaining ring (21). Remove both assemblies and shaft attached to mechanism plate. Clean thoroughly, removing old grease and dirt, and relubricate. Reassemble in reverse order. Adjust tab on follower lever assembly (23) so that pinch roller (22) engages flywheel capstan just before lever (54) releases supply reel pulley (9) from "Stop" position to "Forward". This prevents flare out of the tape in the supply reel, from "Stop" to "Forward" position.

MAINTENANCE

Cleaning The Play-Record Head-

The play-record head is subject to an accumulation of tape coating residue which is worn off the tape as it passes the head. This should be periodically removed since it may cause faint recordings and poor playback. Wipe off the record and erase head contact surfaces carefully with a clean cloth. If dirt is caked or hard and will not come off with a dry cloth, dampen the cloth slightly with carbon tetrachloride.

NOTE: Do not use a brush or excessive amount of solvent on the head surfaces.

Lubrication-

On normal use, the Ekotape requires a limited amount of lubrication. Motor, flywheel shaft, reel spindles, pinch roller assembly and idlers operate in oilite bearings. Whenever unit is disassembled for repair, clean all bearings, cams, and levers, and lubricate the following:

1. Lubricate all oilite bearings with SAE 20 oil.

2. Lubricate all cams and levers with Liqui-Moly NV Grease or equivalent.

3. Apply a thin film of lubricant on the working areas of parts.

NOTE: Do not use cleaning solvent on oilite bearings. Do not overlubricate.

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
V1		5879, Pre. Amp.	C18	S6065-3	Cap. Ceramic, 200MMF @ 500V.
V2		6C4, 1st A. F. Amp.	C19	211-14492	Cap. Molded Paper, .2MFD @ 400V.
V3		6C4, 2nd A. F. Amp.	C20	211-18931	Cap. Molded Paper, .47MFD @ 200V.
V4		6SN7GT, Record Amp. & Cathode Follower	C21	241-14260-1	Cap. Ceramic, 3000MMF @ 500V.
V5		6AQ5, Bias Osc.	C22	241-14260-1	Cap. Ceramic, 3000MMF @ 500V.
V6		5Y3GT, Rectifier	C23	S6065-2	Cap. Ceramic, 100MMF @ 500V.
C1A	241-19367	Elect. Cap., 40MFD @ 450V.	C24	241-14260-2	Cap. Ceramic, 17000MMF @ 500V.
C1B		Elect. Cap., 40MFD @ 450V.	R1	241-17940	Volume Control, 500K, 1/2 W.
C1C		Elect. Cap., 40MFD @ 450V.	R2	29501-53	Resistor, 510K, 1/2 W.
C2A	241-14238	Elect. Cap., 40MFD @ 450V.	R3	29501-29	Resistor, 22K, 1/2 W.
C2B		Elect. Cap., 40MFD @ 450V.	R4	29501-11	Resistor, 1K, 1/2 W.
C2C		Elect. Cap., 40MFD @ 25V.	R5	29501-53	Resistor, 510K, 1/2 W.
C3	S6063	Elect. Cap., 50MFD @ 6V.	R6	29501-56	Resistor, 1MEG, 1/2 W.
C4	S6065-3	Cap. Ceramic, 200MMF @ 500V.	R7	29501-44	Resistor, 150K, 1/2 W.
C5	S3595	Cap. Molded Paper, .1MFD @ 400V.	R8	29501-35	Resistor, 51K, 1/2 W.
C6	S4261	Cap. Molded Paper, .05MFD @ 400V.	R9	29501-14	Resistor, 2K, 1/2 W.
			R10	29501-35	Resistor, 51K, 1/2 W.
C7	S3595	Cap. Molded Paper, .1MFD @ 400V.	R11	29501-44	Resistor, 150K, 1/2 W.
C8	211-14912	Cap. Molded Paper, .05MFD @ 200V.	R12	29501-41	Resistor, 100K, 1/2 W.
			R13	29501-14	Resistor, 2K, 1/2 W.
C9	211-30639	Cap. Molded Paper, .02MFD @ 400V.	R14	29501-48	Resistor, 240K, 1/2 W.
			R15	29501-21	Resistor, 5.1K, 1/2 W.
C10	211-15048	Cap. Molded Paper, .047MFD @ 400V.	R16	29501-56	Resistor, 1MEG, 1/2 W.
			R17	29501-75	Resistor, 5.1K, 1 W.
C11	S4261	Cap. Molded Paper, .05MFD @ 400V.	R18	29501-35	Resistor, 51K, 1/2 W.
			R19	29501-95	Resistor, 2MEG, 1/2 W.
C12	S6065-9	Cap. Ceramic, 400MMF @ 500V.	R20	29501-44	Resistor, 150K, 1/2 W.
C13	S6065-9	Cap. Ceramic, 400MMF @ 500V.	R21	29501-53	Resistor, 510K, 1/2 W.
C14	S6065-3	Cap. Ceramic, 200MMF @ 500V.	R22	29501-48	Resistor, 240K, 1/2 W.
C15	S6065-3	Cap. Ceramic, 200MMF @ 500V.	R23	29501-48	Resistor, 240K, 1/2 W.
C16	241-12167-1	Cap. Molded Paper, .006MFD @ 400V.	R24	29501-41	Resistor, 100K, 1/2 W.
			R25	29501-32	Resistor, 30K, 1/2 W.
C17	S6065-3	Cap. Ceramic, 200MMF @ 500V.	R26	29501-36	Resistor, 62K, 1/2 W.

PROPERTY OF
E. F. DIANKENSHIP
3671 MEADE ST.
DENVER, COLORADO

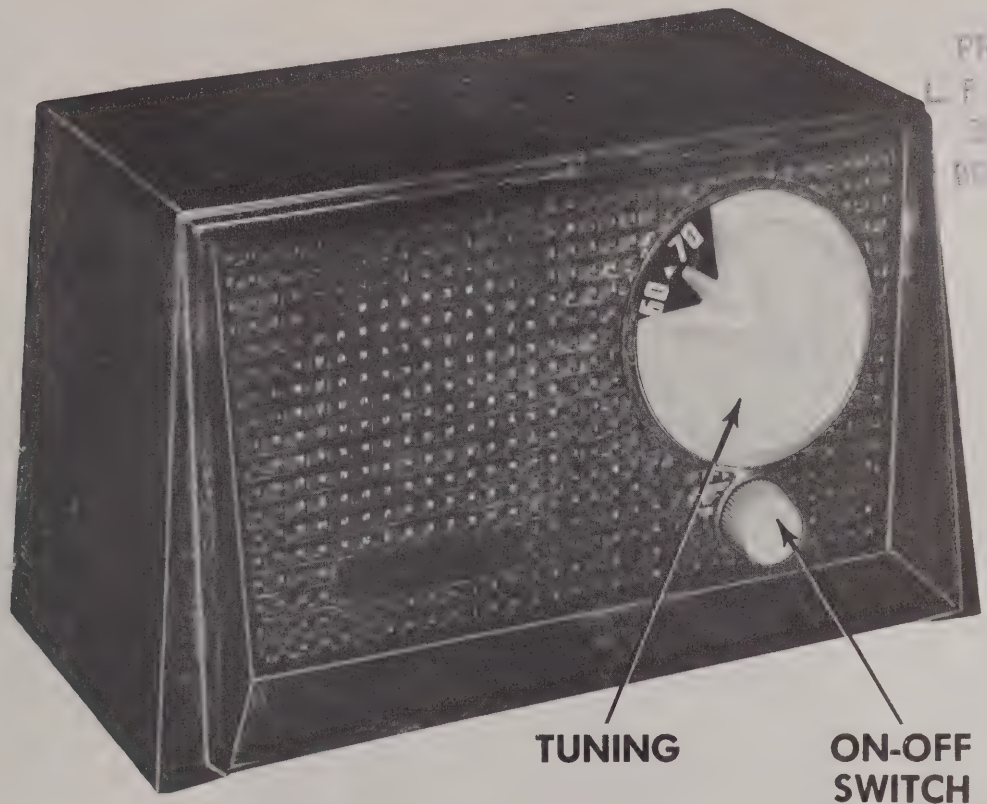
ELECTRICAL PARTS LIST - Con't

Ref. No.	Part No.	Description
R27	29501-36	Resistor, 62K, 1/2 W.
R28	29501-14	Resistor, 2K, 1/2 W.
R29	29501-35	Resistor, 51K, 1/2 W.
R30	29501-53	Resistor, 510K, 1/2 W.
R31	29501-29	Resistor, 22K, 1/2 W.
R32	29501-53	Resistor, 510K, 1/2 W.
R33	29501-17	Resistor, 3K, 1/2 W.
R34	29501-41	Resistor, 10K, 1/2 W.
R35	29502-15	Resistor, 1K, 5W.
R36	29502-14	Resistor, 20K, 10W.
T1	242-17935	Power Transformer
L1	241-14246-1	Bias Osc. Coil
L2	242-17937	Filter Choke
M1	28755-7	Fuse, 2Amp.
M2	P11139-1	Lamp, #51
M3	242-18165	Selector Switch Assy.
M4	241-17949	Equalizer Switch
M5	241-17942	Speaker Switch
M6		On-Off Switch

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description
1	241-17818-1	Control Knobs, Amplifier
2	242-19844-1	Mechanism Control Knob Assy.
3	241-15116	Socket Hd. Set Screw
4	242-17815-1	Knob Assembly
5	241-17816-2	Back Cover
6	29529-14	Rec. Pan. Hd. Mach. Screw
7	241-17817-1	Record Head Cover
8	29529-41	Rec. Pan Hd. Mach. Screw
9	242-17761	Reel Shaft Assembly (left)
10	242-17771-1	Reel Shaft Assembly (right)
11	241-17770	Washer, Fibre
12	241-17770	Washer, Fibre
13	241-17814-1	Top Panel
14	29529-40	Mach.Screws Top Panel Mtg.
15	29527-4	Screw
16	29602-103	Washer, Steel
17	241-17747	Washer, Fibre
18	242-17744	Pinch Roller Assembly
19	241-17722	Washer, Fibre
20	241-12138	Spring
21	29650-1	Retaining Ring
22	242-17741-2	Pinch Roller Lever Assembly
23	242-17739-2	Follower Lever Assembly
24	241-17734	Spring
25		Screw, Record Head Mounting
26		Flat Washer Steel
27	29650-1	Retaining Ring
28	242-17748-1	Pressure Pad Assembly
29	241-17801	Spring
30	242-14159	Play-Record-Erase Head Assy.
31	29527-13	Screw (2 Used)
32	241-17754	Top Tape Guide (2 Used)
33	241-17753	Tape Guide Spacer (2 Used)
34	241-17752	Tape Guide Shelf
35	242-17710-1	Pinch Roller Cam Assembly
35A	242-17707-1	Cam and Shaft Assembly
36	242-17713-1	Index and Interlock Lever Assy.
37	241-17801	Spring
38	29651-1	Retaining Ring
39	241-12059	Spring Tension Washer
40	29602-124	Washer
41		Remote Lever Arm
42	241-17734	Spring
43	242-17683-3	Mechanism Plate Assembly
44	29651-1	Retaining Ring
45	244-17758-1	Brake Lever Assembly
46	241-17734	Spring
47	241-12059	Spring Tension Washer
48	29602-122	Washer
49	29651-1	Retaining Ring
50	241-17734	Spring
51	242-17755-1	Remote Lever Assembly
52	242-19349	Switch Cam Assembly
53	242-1775	Set Screw
54	242-17758-1	Brake Lever Assembly
55	242-17695-1	Reel Shaft Support Assy.
56	29602-124	Washer
57	241-12059	Spring Tension Washer
58	241-17770	Washer, Fibre
59	241-17770	Washer, Fibre
60	241-17801	Spring
61	241-17801	Spring
62	242-17703-2	Reel Shaft Support Assy.(right)
63	241-17770	Washer, Fibre
64	29650-2	Retaining Ring
65	29602-133	Washer, Steel
66	241-17775	U-Washer, Steel
67	241-17086-4	Pin
68	241-17777	Clutch Disc
69	29650-2	Retaining Ring
70	242-17773-1	Reel Pulley Assembly
71	29602-102	Washer, Steel
72	241-17644	Spring
73	241-27799-1	Self Locking Wing Nut
74	241-17802	Spring
75	241-17802	Spring
76	242-17736-1	Top Lever and Idler Assy.
77	29650-1	Retaining Ring
78	241-17723	Spring Tension Washer
79	242-17724-1	Cam Shaft Assy.
80	242-17739-2	Follower Lever Assembly
81	241-17717-1	Idler Link Assembly
82	241-17717-1	Idler Link Assembly
83	242-17737-2	Follower Lever Assembly
84	242-17766-1	Reel Pulley Assembly
85		Set Screw Allen
86	242-17731-2	Lower Lever and Idler Assy.
87	241-17723	Spring Tension Washer
88	29650-1	Retaining Ring
89	241-17778-1	Flywheel and Shaft Assy.
90	241-13609	Steel Ball
91	29650-1	Retaining Ring
92		Keyed Washer
93	241-17723	Spring Tension Washer
94	242-17788-2	Motor Pulley Assembly(Includes items 95, 96 and 97)
95		Motor Pulley Clutch Washer
96	241-17789-2	Motor Pulley
97		Allen Set Screw
98		Lockwasher
99		Support Plate Mounting Screw
100	242-17765-1	Support Plate Assembly
101		Washer Steel
102		Lockwasher
103		Motor Mounting Screw
104	241-17674	Motor
104A	241-17786-1	Motor Mounting Plate
105	241-14134	Fan
106		Set Screw
107	242-17716-1	Idler Link Assembly
108	241-17723	Spring Tension Washer
109	29650-1	Retaining Ring
110	242-17719-3	Idler Assembly
111	241-17722	Washer Fibre
112	29650-1	Retaining Ring
113	242-17884	Brake Arm Assembly

PROPERTY OF
L. F. BLANKENSHIP
[illegible]
[illegible] COLORADO



FIRESTONE MODELS
4-A-141, 4-A-142 (Code 382-5-377)

FIRESTONE MODELS
4-A-141, 4-A-142 (Code 382-5-377)

TRADE NAME	Firestone Models 4-A-141, 4-A-142 (Code 382-5-377)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Pkwy., Akron, Ohio
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-DC
RATING	.21 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1600KC	"	"	A5	"
3.		Loop (Radiated)	1000KC	Tune to 1000KC signal.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

FIRESTONE
MODEL 4-A-141 (Code 382-5-377)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		FIRESTONE PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amp.	12BA6	12BA6	7BK	
V3	Det. -AVC-AF Amp	12AV6	12AV6	7BT	
V4	Audio Output	50C5	50C5	7CV	
V5	Rect.	35W4	35W4	5BQ	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	FIRESTONE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	■50	150		FP311	TM-3011	T-295	
B	▲30	150					
C	20	25					

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	FIRESTONE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C2	20000			DD-203	817-02		
C3	20000			DD-203	817-02		
C4A	220						
B	2000						
C	5000		♦	♦PC-150	♦1408-01		
D	250						
E							
C5	10000			DD-103	811-01	DC511	
C6	20000			DD-203	817-02		
C7	20000			DD-203	817-02		

♦ Items C4A, C4B, C4C, C4D, C4E, R5A, R5B and R5C are combined in one unit. When replacing items separately, C4D and C4E should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	FIRESTONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1	500K	½	C43094					Volume & Switch

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	FIRESTONE PART No.	IRC PART No.	
R2	22KΩ	½		BTS-22K	
R3	68Ω	½		BTS-68	
R4	2.2Meg	½		BTS-2.2Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	FIRESTONE PART No.	IRC PART No.	
R5A	6.8Meg	½	♦	BTS-6.8Meg	
B	470KΩ	½		BTS-470K	
C	470KΩ	½		BTS-470K	
R6	120Ω	½		BTS-120	
R7	1200Ω	1		BTA-1200	

♦ Items C4A, C4B, C4C, C4D, C4E, R5A, R5B, R5C are combined in one unit.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	FIRESTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.4KΩ	3.3Ω	Part of SPKR	Z1101	A-3025	A-3332	26S58 ①	S-12X	① Drill one new mounting hole.

SPEAKER

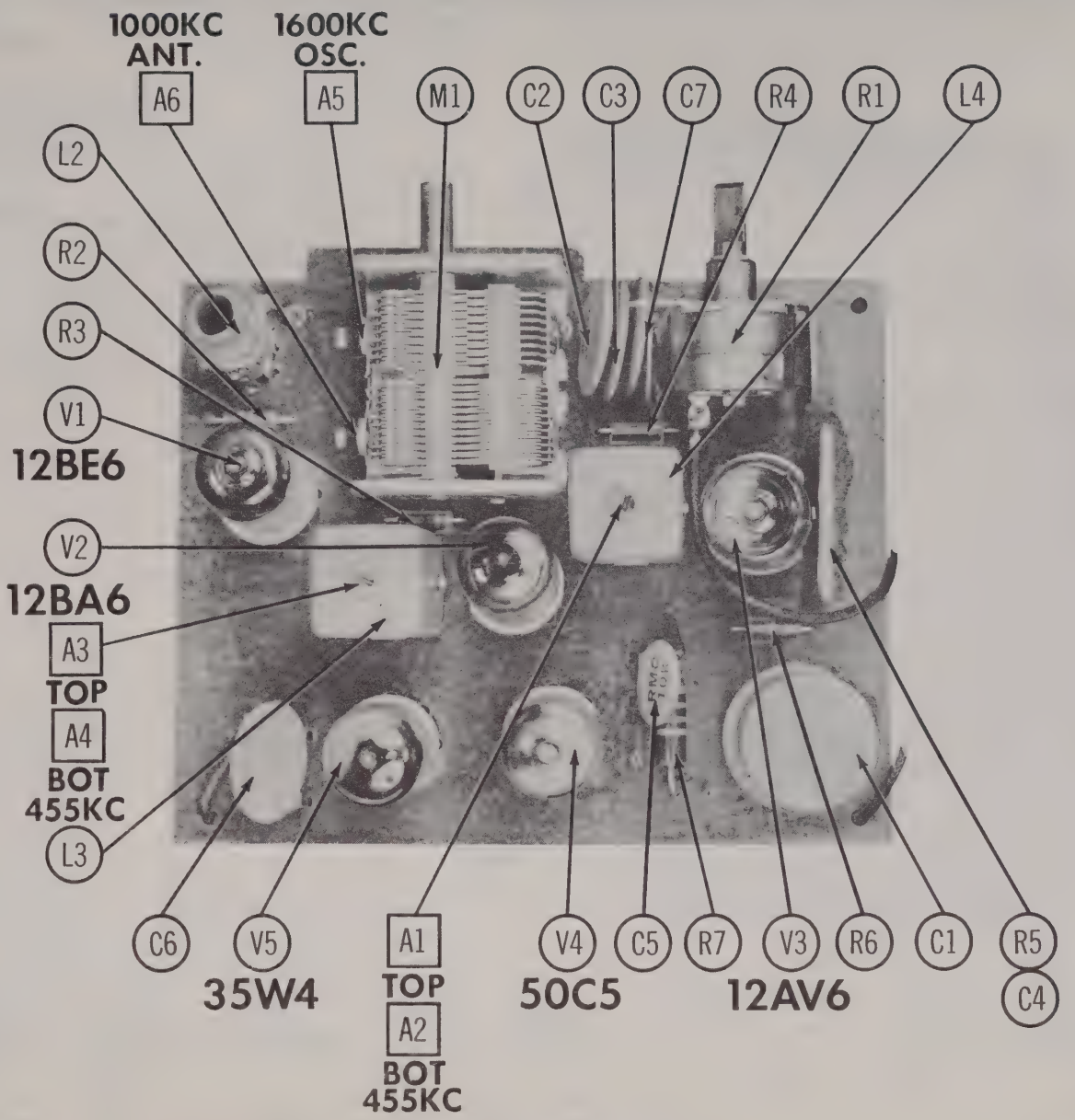
ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	FIRESTONE PART No.	QUAM PART No.	
SP1	4"	PM	3.3Ω	C43096	4A07	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3.5Ω						Includes cabinet back.
L2	Osc. Coil	.7Ω	8Ω					
L3	Input IF	15Ω	15Ω	C43042	16-6758	BC-352	13-PC1	
L4	Output IF	15Ω	15Ω	C43042	16-6758	BC-353	13-PC2	

MISCELLANEOUS

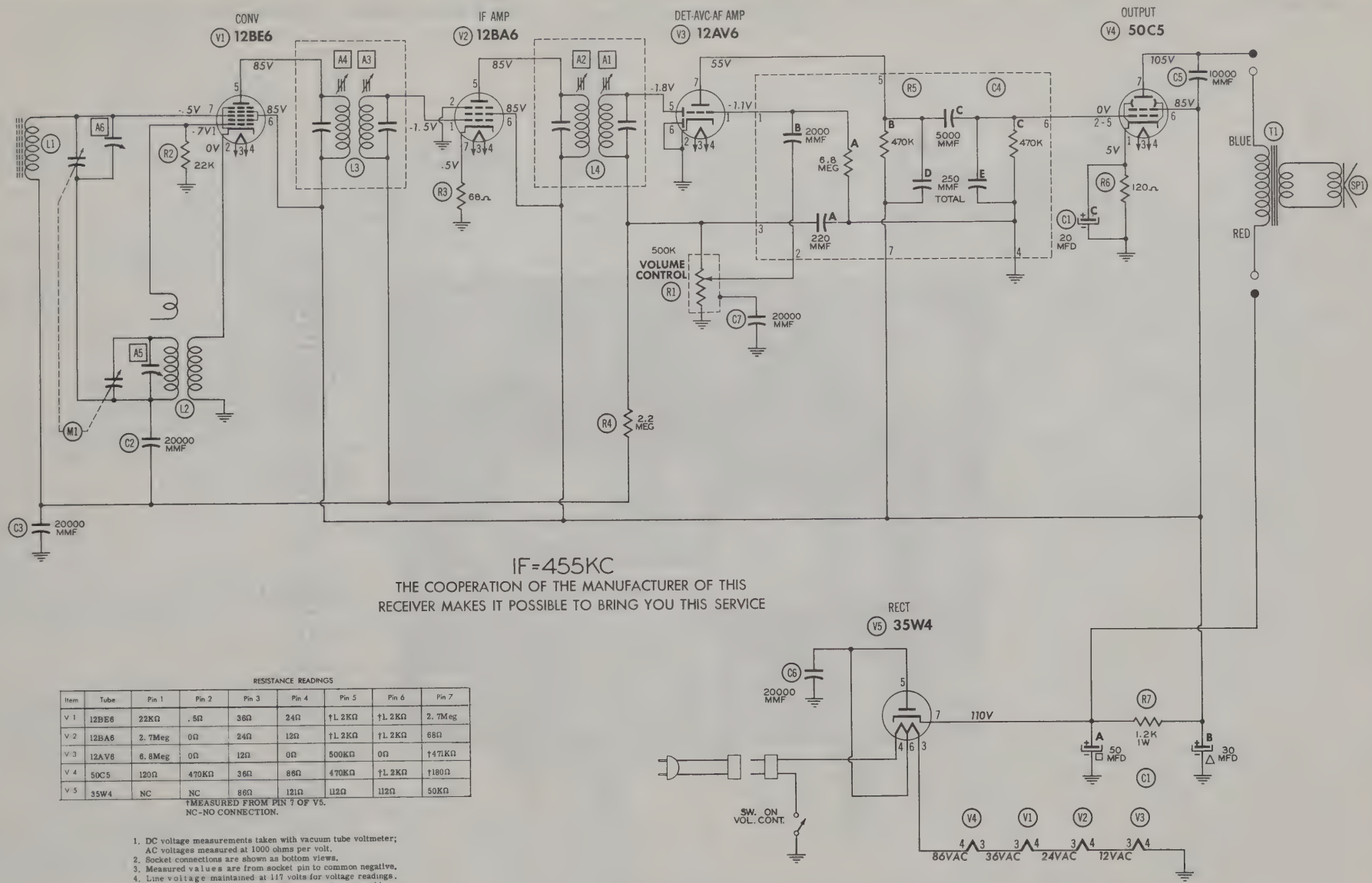
ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M1	Tuning Cap.	D43095	2 Gang



CHASSIS TOP VIEW

SET 301 FOLDER 5

FIRESTONE
MODEL 4-A-141 (Code 382-5-377)



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.5Ω	36Ω	24Ω	†1.2KΩ	†1.2KΩ	2.7Meg
V 2	12BA6	2.7Meg	0Ω	24Ω	12Ω	†1.2KΩ	†1.2KΩ	68Ω
V 3	12AV6	6.8Meg	0Ω	12Ω	0Ω	500KΩ	0Ω	†47KΩ
V 4	50C5	120Ω	470KΩ	36Ω	86Ω	470KΩ	†1.2KΩ	†180Ω
V 5	35W4	NC	NC	86Ω	121Ω	112Ω	112Ω	50KΩ

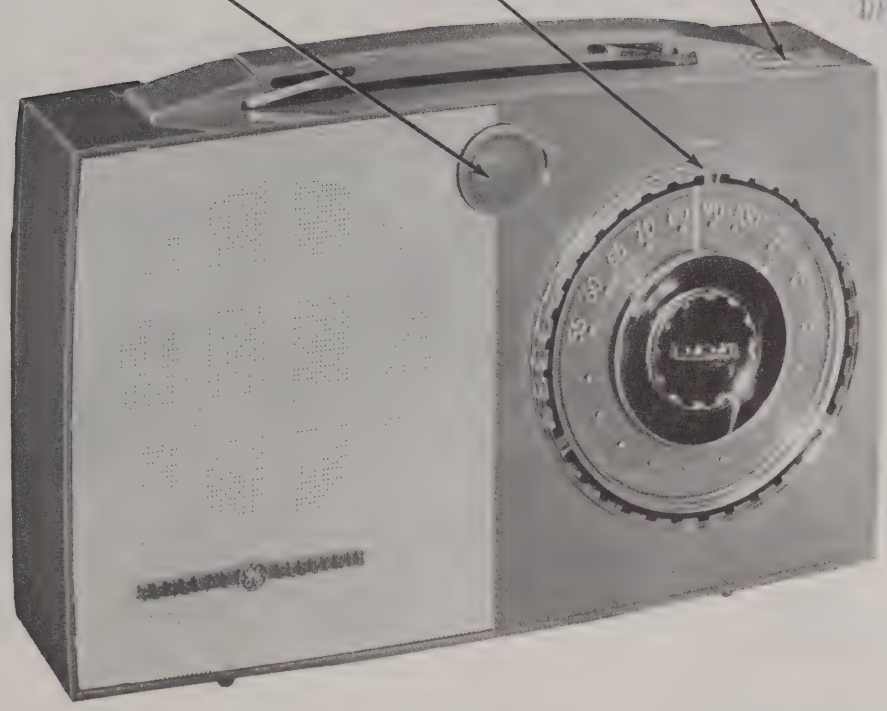
†MEASURED FROM PIN 7 OF V5.
NC-NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1955

PROPERTY OF
L. F. M. UNIVERSITY
DENVER, COLORADO



GENERAL ELECTRIC
MODELS 635, 636, 637

GENERAL ELECTRIC
MODELS 635, 636, 637

TRADE NAME	General Electric Models 635, 636, 637
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N.Y.
TYPE SET	Battery Operated Portable AM Superheterodyne Receiver
TUBES (Four)	Types: 1R5 Conv., 1U4 IF Amp., 1U5 Det.-AVC-AF Amp., 3V4 Output
POWER SUPPLY RATINGS	1.5 Volts "A" Supply & 75 Volts "B" Supply 2.0MA @ 1.5 Volts DC & 8.5MA @ 75 Volts DC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary ot obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 6 (grid) of 1R5 (V1). Low side to chassis.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	1500KC	Tune to 1500KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	600KC	Tune to 600KC signal	"	A7	Adjust for maximum output rocking tuning gang.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	1R5	1R5	7AT	
V2	IF Amplifier	1U4	1U4	6AR	
V3	Det.-AVC-AF Amp.	1U5	1U5	6BW	
V4	Audio Output	3V4	3V4	6BX	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: General Electric PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1	10	100	RCE-172				

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: General Electric PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	NOTES
C2	.05	200	RCC-086	DF-503		PT415	
C3	47		RCW-3075	DD-470	831-470	UC-5447	
C4	10000		RCW-3054	DD-103	811-01	DC-511	
C5	3000		RCW-3118	DD-302	811-003	UC-523	
C6	2.7		RCW-3039				
C7A	82		RCN-082				
B	2000						
C	220						
D	5000						
C8	10000		RCW-3054	DD-103	811-01	DC-511	
C9	2000		RCW-3119	DD-202	801-002	DC-522	

CONTROLS

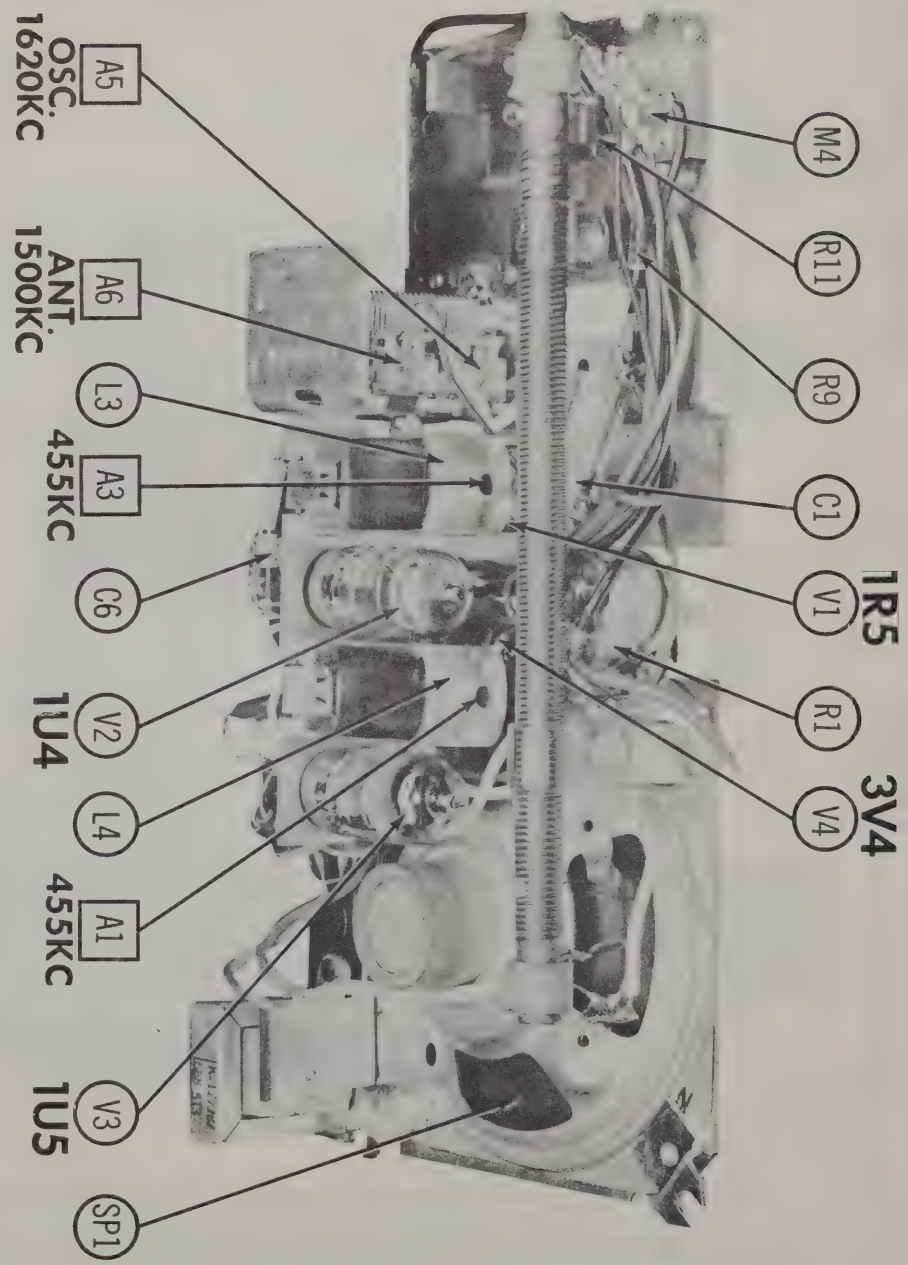
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: General Electric PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	RRC-239	Q13-137	A47-1Meg-Z	B-70-S	U-53	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-2	SWE-20	Not Req.	US-27	Attach to R1A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	100KΩ	½	URD-097	BTS-100K	
R3	3.3Meg	½	URD-133	BTS-3.3Meg	
R4	15KΩ	½	URD-077	BTS-15K	
R5	3.3Meg	½	URD-133	BTS-3.3Meg	
R6	10Meg	½	URD-145	BTS-10Meg	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R7	4.7Meg	½	URD-137	BTS-4.7Meg	
R8	1Meg	½	URD-121	BTS-1Meg	
R9	470Ω	½	URD-041	BTS-470	
R10	3.3Meg	½	URD-133	BTS-3.3Meg	
R11	150Ω	½	URD-029	BTS-150	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	General Electric PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.5Ω		RLL-058				
L2	Osc. Coil	1.5Ω	7.5Ω	RLC-129	14-1074	BC-387	70-OSC	
L3	Input IF	37Ω	37Ω	RTL-152	16-6758	BC-352	12-C1	
L4	Output IF	37Ω	37Ω	RTL-152	16-6758	BC-353	12-C2	

BATTERIES

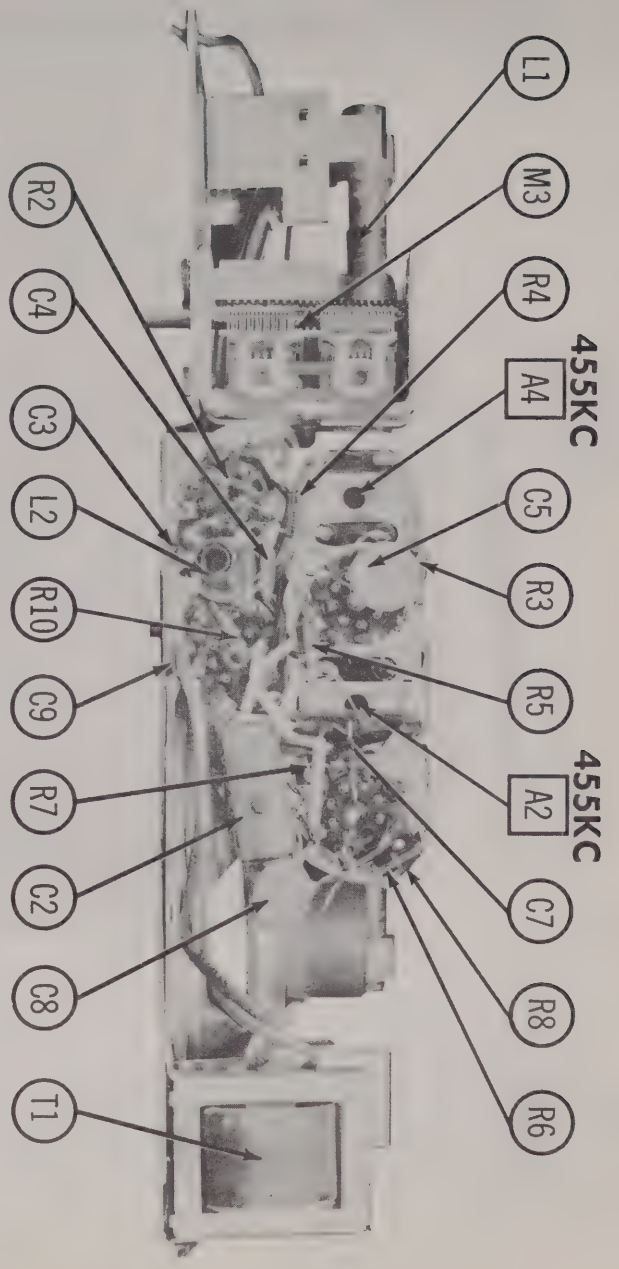
ITEM No.	VOLTAGE	General Electric PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M1 M2	1.5V "A" 75V "B"		964	437		2IR	XX50		Connect two in parallel

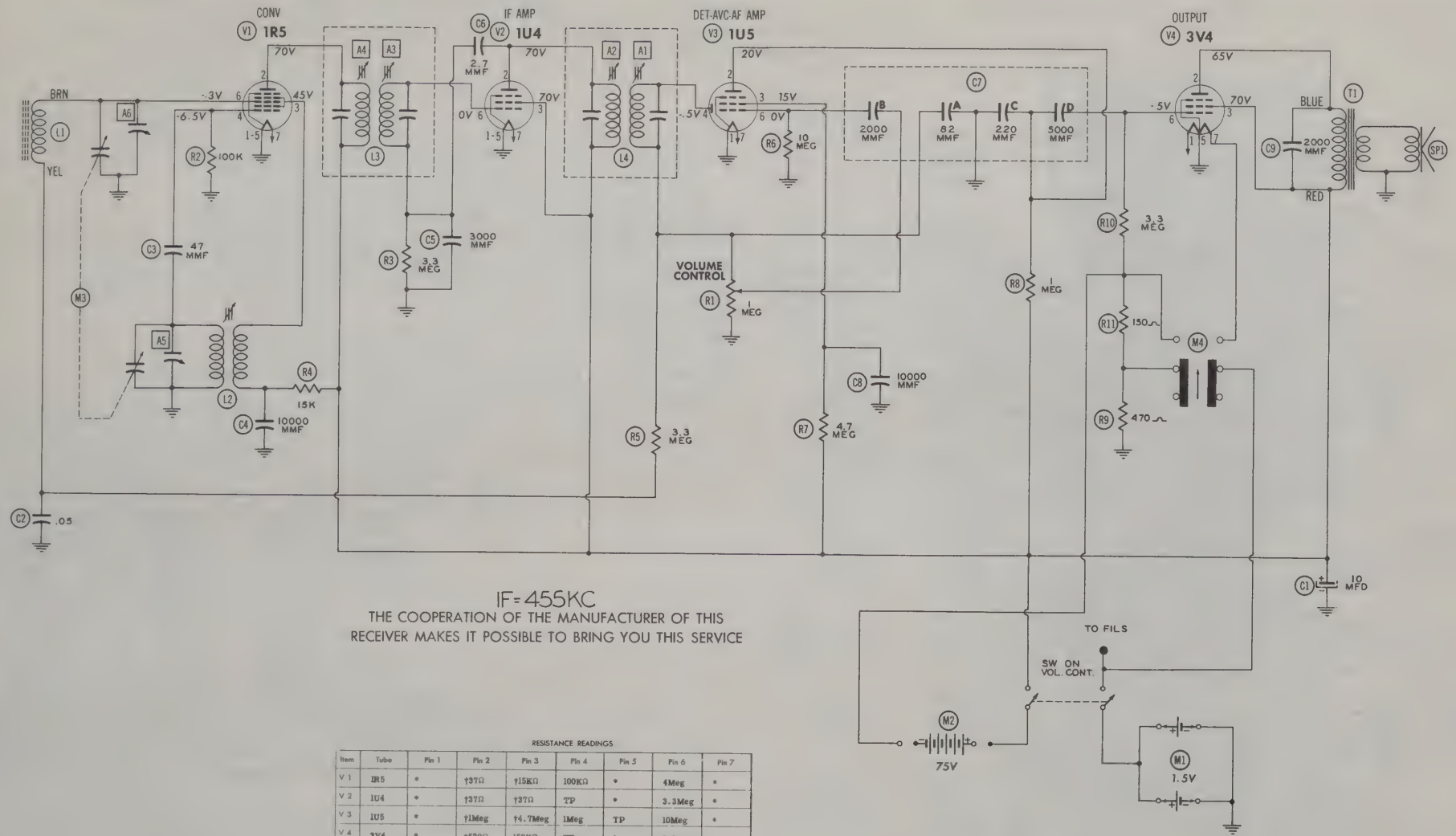
MISCELLANEOUS

ITEM No.	PART NAME	General Electric PART No.	NOTES
M3	Tuning Cap.	RCT-075	2 Gang (14-295MMF, 14-120MMF)
M4	Switch	RSS-008	Battery Saver (DPDT - Slide type)
	Cabinet	RAU-429	Model 635
	Cabinet	RAU-430	Model 636
	Cabinet	RAU-431	Model 637
	Handle Assy.	RHY-065	Model 635
	Handle Assy.	RHY-066	Model 636
	Handle Assy.	RHY-067	Model 637
	Knob	RDK-390	Tuning
	Knob	RDK-391	On-off-volume - Model 635
	Knob	RDK-392	On-off-volume - Model 636
	Knob	RDK-393	On-off-volume - Model 637
	Switch Button	RDK-394	Battery saver - Model 635
	Switch Button	RDK-395	Battery saver - Model 636
	Switch Button	RDK-396	Battery saver - Model 637

PROPERTY OF

CHASSIS—BOTTOM VIEW





IF = 455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	†37Ω	†15KΩ	100KΩ	*	4Meg	*
V 2	1U4	*	†37Ω	†37Ω	TP	*	3.3Meg	*
V 3	1U5	*	†1Meg	†4.7Meg	1Meg	TP	10Meg	*
V 4	3V4	*	†520Ω	150KΩ	TP	*	3.3Meg	*

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.
† MEASURED FROM POSITIVE SIDE OF C1.
TP - TIE POINT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1955

MOTOROLA MODELS
55J1, 55J2 (Ch. HS-454)

PROPERTY OF
E. F. BLANKENSHIP
3001 WADE ST.
DENVER, COLORADO

MOTOROLA MODELS
55J1, 55J2 (Ch. HS-454)

TRADE NAME	Motorola Models 55J1, 55J2 (Ch. HS-454)
MANUFACTURER	Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.
TYPE SET	Three Power Portable AM Superheterodyne Receiver
TUBES (Four)	Types: 1R5 Conv., 1U4 IF Amp., 1U5 Det.-AVC-AF Amp., 3V4 Output
POWER SUPPLY RATING	110-120 Volts AC-DC (or) 3 Volts "A" Supply & 90 Volts "B" Supply .11 Amp. @ 117 Volts AC (or) 155MA @ 3 Volts DC & 11.5MA @ 90 Volts DC
TUNING RANGE—BROADCAST	535KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer parallel with base of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to antenna lug on tuning gang. Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2.	"	"	1620KC	"	"	A4	"
3.	"	"	535KC	Tuning gang fully closed	"	A5	"
4.		Loop	1620KC	Tuning gang fully open	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
5.		"	1400KC	Tune to 1400KC signal	"	A6	"

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		MOTOROLA PART No.	STANDARD REPLACEMENT		
V1	Converter	1R5	1R5	7AT	
V2	IF Amplifier	1U4	1U4	6AR	
V3	Det.-AVC-AF Amp.	1U5	1U5	6BW	
V4	Audio Output	3V4	3V4	6BX	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	MOTOROLA PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	80	150	23B633289			T-242	
B	80	150					
C	200	10					

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	MOTOROLA PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C2	.05	200	8R121005	DF-503		PT415	
C3	10000		21R482726	DD-103	811-01	DC-511	
C4	.1	200	8R121573	DF-104		PT401	
C5	10000		21R482726	DD-103	811-01	DC-511	
C6	5.6		21R121154				Note 1
C7A	150				811-151	UC-5315	
B	2000				801-002	DC-522	
C	10000		♦21B621535	♦PC-165	811-01	DC-511	
D	150				811-151	UC-5315	
E	5000				811-005	DC-525	
C8	2000		21R115383	DD-202	801-002	DC-522	
C9	10000		21R482726	DD-103	811-01	DC-511	
C10	.047	400	8K490232	DF-503		PT4147	
C11	.047	400	8K490232	DF-503		PT4147	

Note 1. Not used in some versions.
♦ Items C7A, C7B, C7C, C7D, C7E, R8A, R8B, R8C and R8D are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1Meg	½	18K611379	Q13-137	A47-1Meg-Z	BSK-70-S	U-53	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	76-2	SWE-20	Not Req.	US-27	Attach to R1A.

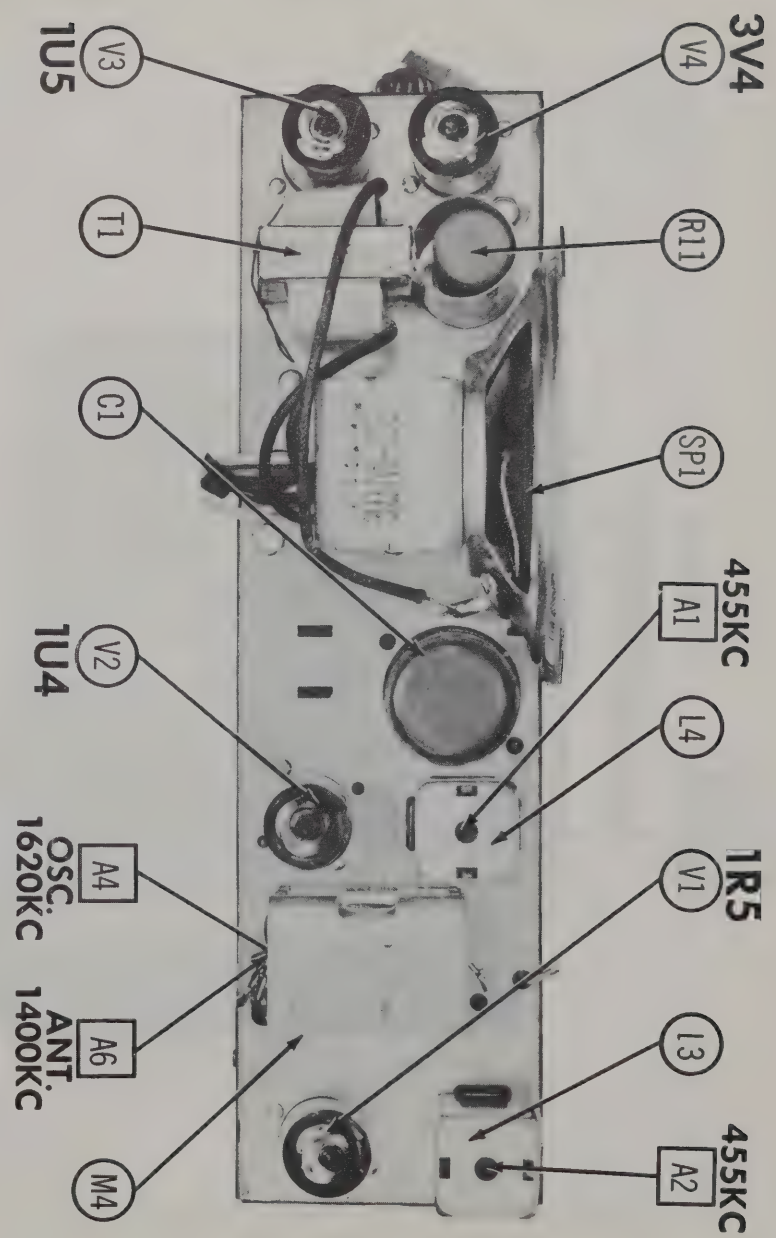
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R2	100KΩ	½	6R6031	BTS-100K	
R3	33KΩ	½	6R6410	BTS-33K	
R4	390Ω	½	6R5554	BTS-390	
R5	10Meg	½	6R2109	BTS-10Meg	
R6	27Ω	½	6R5683	BTS-27	
R7	3.3Meg	½	6R6497	BTS-3.3Meg	
R8A	10Meg	½		BTS-10Meg	
B	4.7Meg	½	♦21B621535	BTS-4.7Meg	
C	1Meg	½		BTS-1Meg	
D	3.3Meg	½		BTS-3.3Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R9	270Ω	½	6R6432	BTS-270	
R10	1000Ω	½	6R6229	BTS-1000	
R11A	150Ω	10	†17B620181		
B	2000Ω			PW10-2000	
R12	820Ω	1	6R5701	BTA-820	
R13	390Ω	½	6R5554	BTS-390	

♦ Items C7A, C7B, C7C, C7D, C7E, R8A, R8B, R8C, R8D are combined in one unit.
† Items R11A, R11B are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	9KΩ	3.5Ω	25K633495-D 25K633945②		A-2927①			S-11Z ①	① Bend mounting tabs down, and mount same as orig. unit. ② Alternate audio output.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	
SP1	4"	PM	3.5Ω	50K633531	3A07	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.9Ω		24K633496				
L2	Osc. Coil	2.2Ω	10.5Ω	24B611273	14-1073 *		69-OSC	
L3	Input IF	27Ω	26Ω	24K611438	16-6758	BC-352	12-C1	
L4	Output IF	27Ω	38Ω	24K633497	16-6758	BC-353	12-C2	

* Leads sufficient mounting support.

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	MOTOROLA PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.062A	48R692077	1003A	RS065	6S75	5M4	75	

BATTERIES

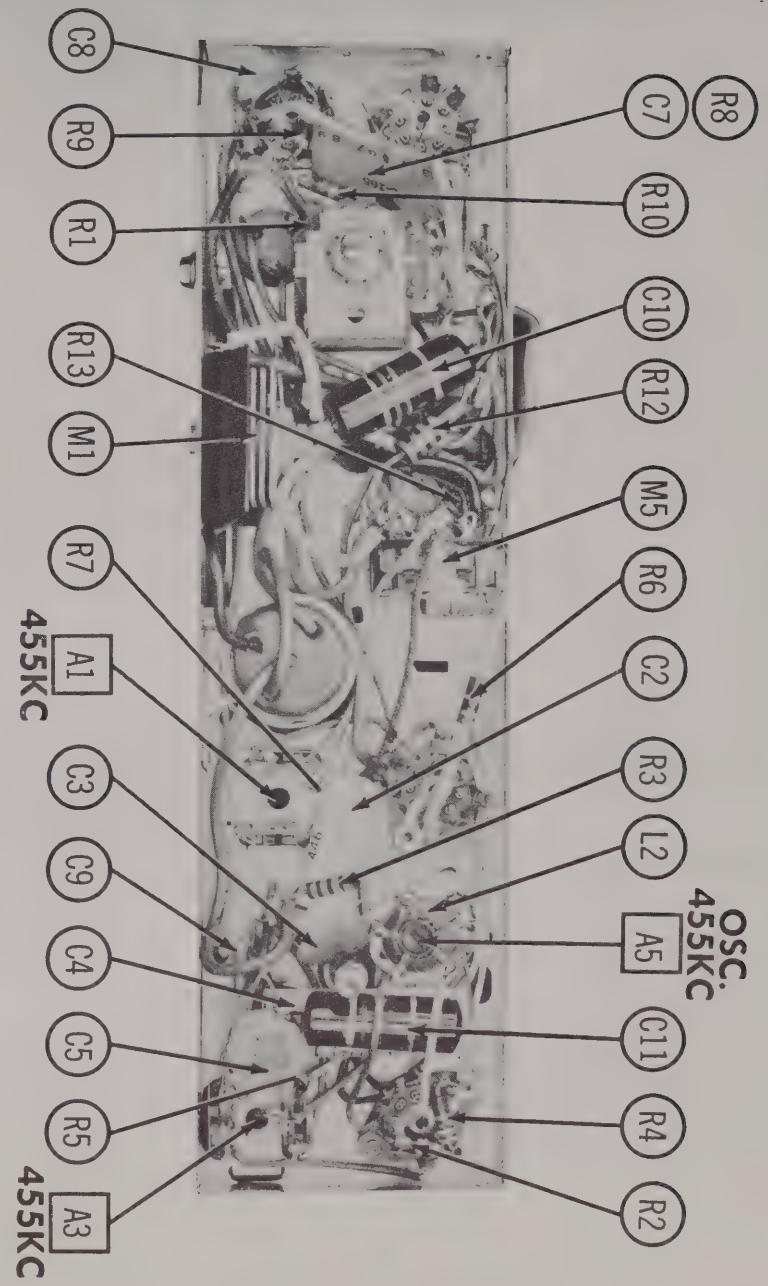
ITEM No.	VOLTAGE	MOTOROLA PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2 M3	1.5V "A" 90V "B"		964	479		21R	P60		Connect 2 in series.

MISCELLANEOUS

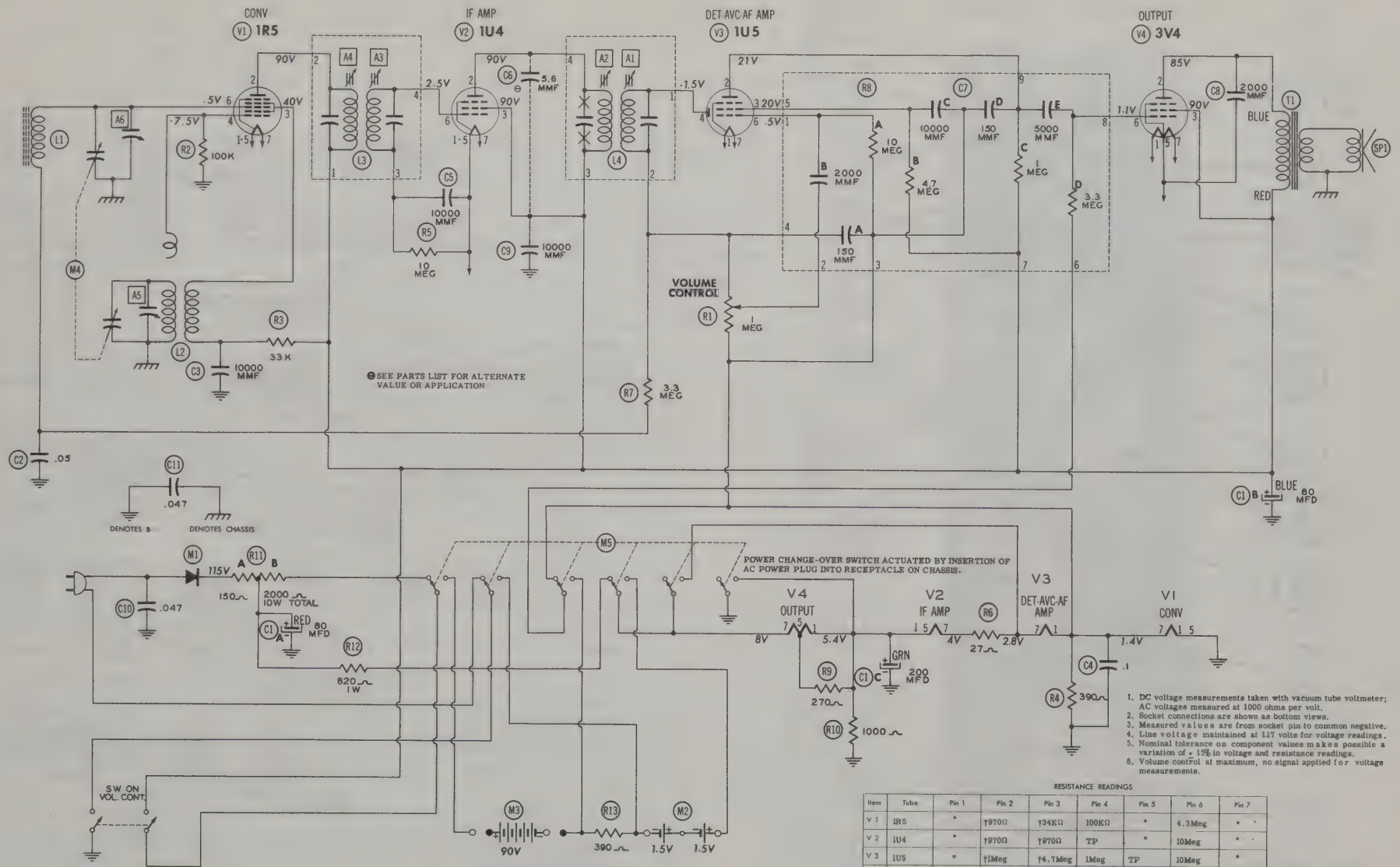
ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M4	Tuning Cap.	19K633494	2 Gang (20-270MMF, 14-105MMF)
M5	Switch	40B633290	Power Changeover (Rotary - wafer type)
	Cabinet	16E633149	Model 55J1
	Cabinet	16K633420	Model 55J2
	Handle	55K633441	Model 55J1
	Handle	55K633442	Model 55J2
	Knob	36K633263	On-off-volume & tuning - Model 55J1
	Knob	36K633262	On-off-volume & tuning - Model 55J2

PROPERTY OF
L. F. BLAWENSHIP

CHASSIS—BOTTOM VIEW



MOTOROLA
Model 55J1



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	†970Ω	†34KΩ	100KΩ	*	4.3Meg	*
V 2	1U4	*	†970Ω	†970Ω	TP	*	10Meg	*
V 3	1U5	*	†1Meg	†4.7Meg	1Meg	TP	10Meg	*
V 4	3V4	*	†1.4KΩ	†970Ω	NC	*	3.3Meg	*

† MEASURED FROM OUTPUT OF M1.
TP - TIE POINT
NC - NO CONNECTION
* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1955

RCA VICTOR
MODEL 6-HF-5 (Ch. RC-150)

PROPERTY OF

RCA VICTOR
MODEL 6-HF-5 (Ch. RC-150)

TRADE NAME	RCA Victor Model 6-HF-5 (Ch. RS-150)
MANUFACTURER	RCA Victor, Radio & "Victrola" Div., Radio Corp. of America, Camden 2, N. J.
TYPE SET	AC Operated Phono Amplifier with 3 Speed Automatic Record Changer
TUBES (Three)	Types 12AX7 AF Amp. -Phase Inverter, (2) 50C5 Output
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	.34 Amp. @ 117 Volts AC

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT RP-198-5, SEE SIMILAR RCA VICTOR CHANGER IN PHOTOFACT SET #273-FOLDER #6.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		RCA Victor PART No.	STANDARD REPLACEMENT		
V1	AF Amp. - Phase Inv.	12AX7	12AX7	9A	
V2	Audio Output	50C5	50C5	7CV	
V3	Audio Output	50C5	50C5	7CV	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	RCA Victor PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	80	150	75980	TCD498	TDL-8050-150	FMT-1540	
B	50	150					
C2	5	50	74521	TC30	TD-5-50	MMT-0505	
C3	8	10VAC				[MMT-0220* MMT-0220*	

* Connect negative leads together & connect positive leads to SP1 & SP2.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	RCA Victor PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C4	.047	400	73553	DF-503		PT4147	
C5	390	500	39642	D6-391	GP2K-391	MC243	
C6	1000	500	53300	D6-102	GP2L-102	MC255	
C7	.01	200	73561	D6-103	GP3-333-103	PT411	
C8	.0039	400	73796	D6-402	GP2-333-402	PT624	
C9	.033	200	79015	DF-303		PT6133	
C10	.0022	600	73595	D6-222	GP2-333-222	PT6222	
C11	.01	400	73561	D6-103	GP3-333-103	PT411	
C12	.022	400	73562	DF-203	817-02	PT4122	
C13	.1	400	73551	DF-104		PT401	
C14	.047	400	73553	DF-503		PT4147	

CONTROLS

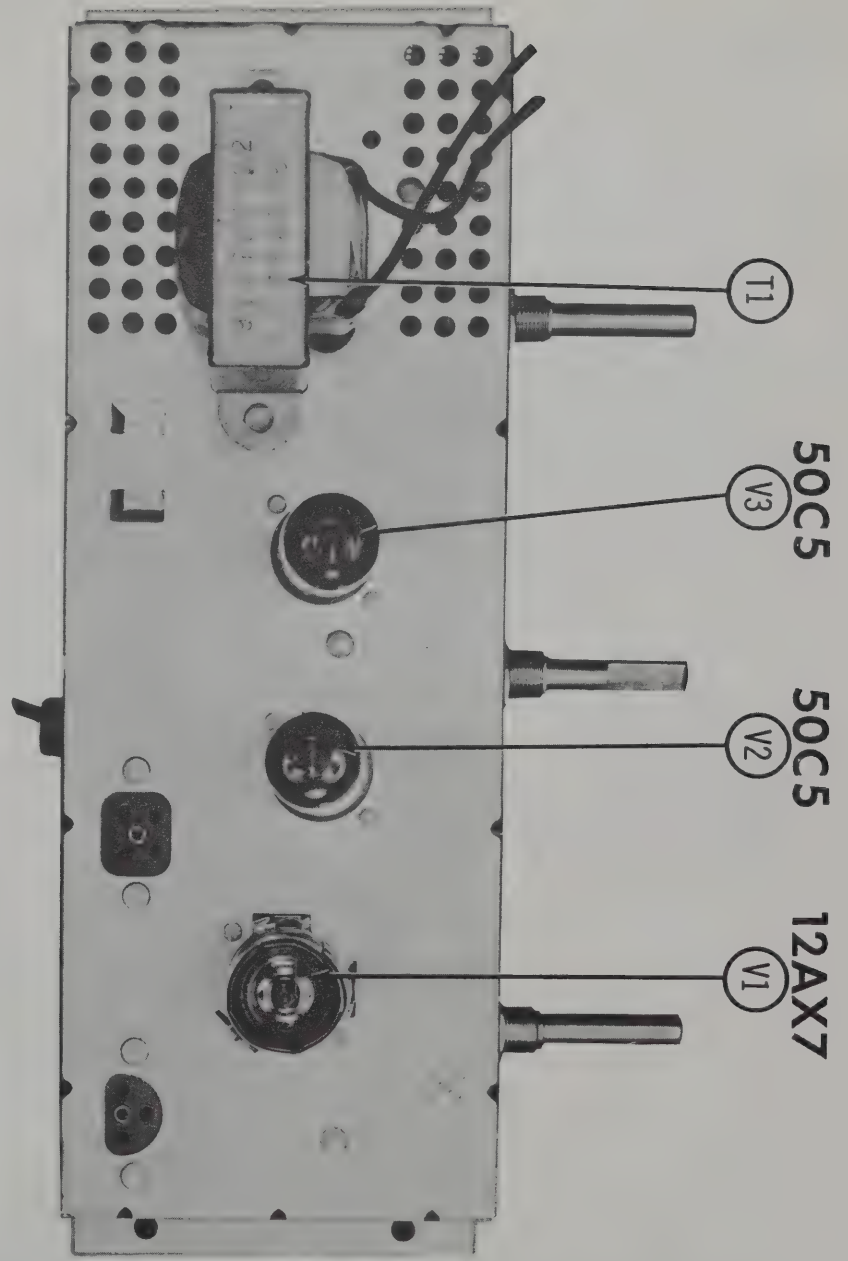
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	RCA Victor PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1.5Meg	½	71596			ABT-167	UDT-291	Volume (Tap at 250K & 500K)
B	Shaft		Not Req.			AK-3		Attach to R1A.
R2A	2Meg	½	100458	Q13-139	A47-2Meg-Z	AB-76	U-55	Bass
B	Shaft		Not Req.	Not Req.	FS-3	AK-3	Not Req.	Attach to R2A.
R3A	2Meg	½	100458	Q13-139	A47-2Meg-Z	AB-76	U-55	Treble
B	Shaft		Not Req.	Not Req.	FS-3	AK-3	Not Req.	Attach to R3A.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R4	120KΩ	½	502412	BTS-120K	
R5	100KΩ	½	502410	BTS-100K	
R6	12KΩ	½	502312	BTS-12K	
R7	220KΩ	½	502422	BTS-220K	
R8	12KΩ	½	502312	BTS-12K	
R9	220KΩ	½	502422	BTS-220K	
R10	3900Ω	½	502239	BTS-3900	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R11	100KΩ	½	502410	BTS-100K	
R12	470KΩ	½	502447	BTS-470K	
R13	470KΩ	½	502447	BTS-470K	
R14	82Ω	1	31959		
R15	1000Ω	1	512210	BTA-1000	
R16	33Ω	1	512033		
R17	33Ω	1	512033		

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	4KΩCT	3.4Ω	100466	Z1002	A-2901	A-3823	24S61	S-53X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	RCA Victor PART No.	QUAM PART No.	
SP1	6"	PM	3.4Ω	100464	6A21	
SP2	3½"	PM	6.6Ω	100465	3A15TZ6.6	
SP3	3½"	PM	6.6Ω	100465	3A15TZ6.6	

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	RCA Victor PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.100ADC	100654	1005A	RS150	6S150	6P2	150	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	RCA Victor PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M2	100653	55-T	GD-J	47	0-1 or 0-1 and 0-3	

PHONO NEEDLE

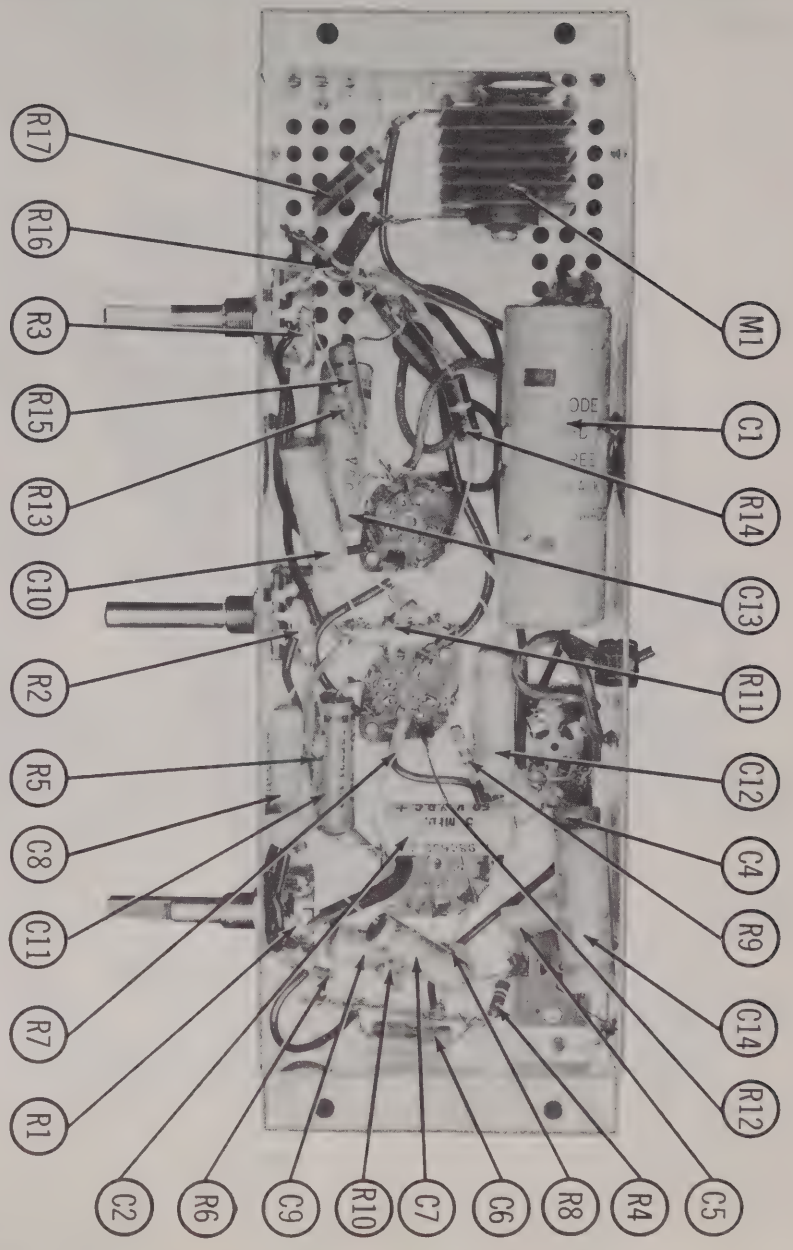
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	RCA Victor PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M3	78827	*S-67 or †S-66 or ♦†S-66SD or ♦S-66D	†AC-434 or ♦†AC-434D1 or †♦AC-434D2 or ♦AC-434D	†W-75TPS or ♦†W-75DS or ♦W-75TPD	* Metal † Jewel ♦ Diamond

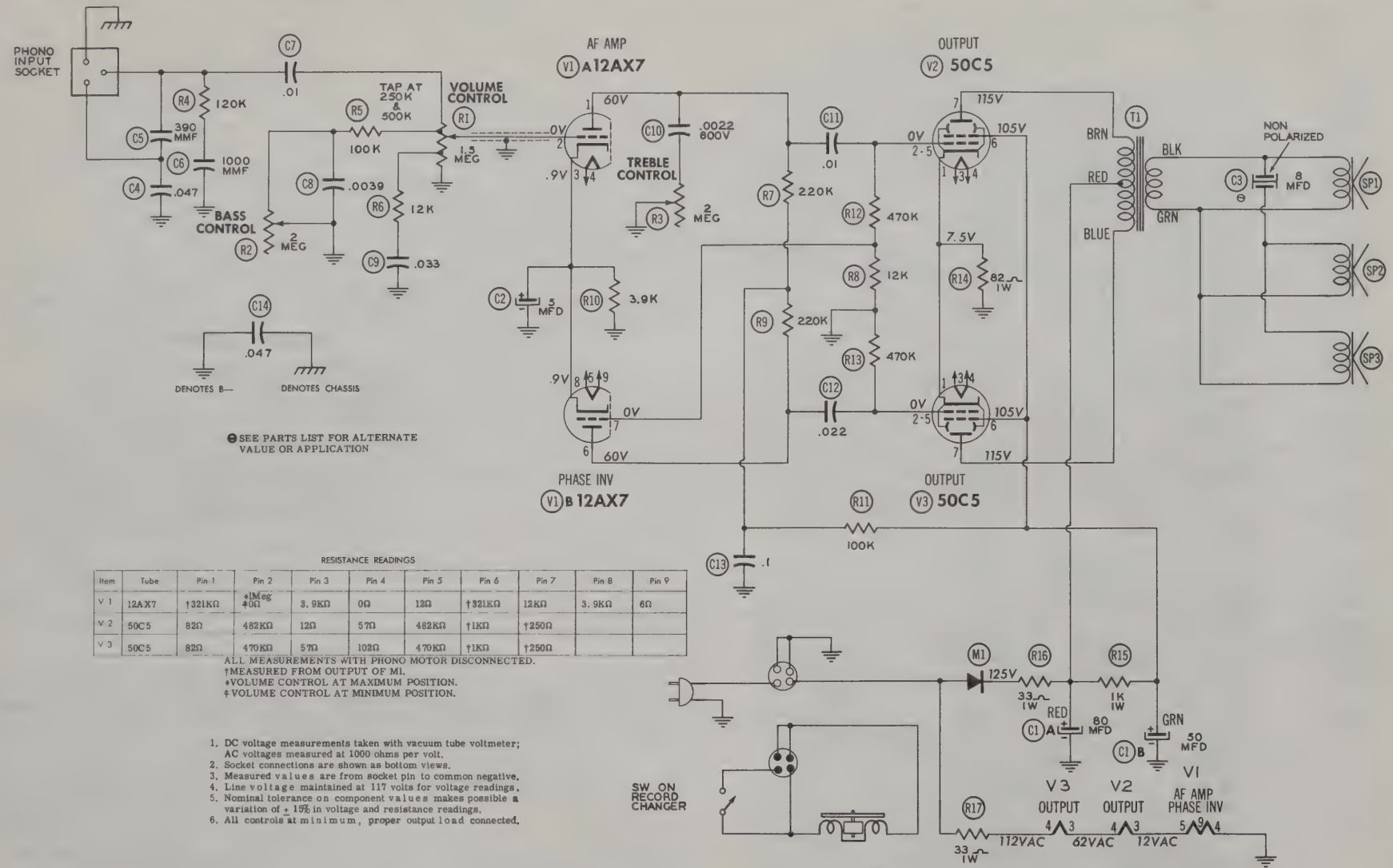
MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
	Knob	100469	Control (3 used)

CHASSIS—BOTTOM VIEW



RCA VICTOR
Model 6-HF-5 (Ch. RS-150)



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AX7	†321KΩ	♦1Meg ‡0Ω	3.9KΩ	0Ω	12Ω	†321KΩ	12KΩ	3.9KΩ	6Ω
V 2	50C5	82Ω	482KΩ	12Ω	57Ω	482KΩ	†1KΩ	†250Ω		
V 3	50C5	82Ω	470KΩ	57Ω	102Ω	470KΩ	†1KΩ	†250Ω		

ALL MEASUREMENTS WITH PHONO MOTOR DISCONNECTED.
†MEASURED FROM OUTPUT OF M1.
♦VOLUME CONTROL AT MAXIMUM POSITION.
‡VOLUME CONTROL AT MINIMUM POSITION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1955

SILVERTONE MODEL
5032 (Ch. 757.80000)

PROPERTY OF
DENVER COLORADO

SILVERTONE MODEL
5032 (Ch. 757.80000)

TRADE NAME	Silvertone Model 5032 (Ch. 757.80000)
SUPPLIER	Sears Roebuck & Co., 925 S. Homan, Chicago, Ill.
TYPE SET	AC Operated Radio-Phono Combination Superheterodyne Receiver
TUBES (Four)	Types: 12BE6 Conv., 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-60 Cycles — RATING .22 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535KC-1640KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
To set pointer, turn tuning capacitor fully closed and set pointer parallel with base of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to antenna stator lug. Low side to B-.	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	50MMF	"	1640KC	"	"	A3	"
3.	"	"	1400KC	Tune to 1400KC signal	"	A4	Adjust for maximum output while rocking tuning gang.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

SILVERTONE
Model 5032 (Ch. 757.80000)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		SILVERTONE PART No.	STANDARD REPLACEMENT		
V1	Converter	12BE6	12BE6	7CH	
V2	Det.-AVC-AF Amp.	12AV6	12AV6	7BT	
V3	Audio Output	50C5	50C5	7CV	
V4	Rectifier	35W4	35W4	5BQ	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	SILVERTONE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	60	150	E324	TCT3117	TDL-804020-150	FMT-333	
B	30	150					
C	20	150					

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	SILVERTONE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C2	8		E313	TCN-10	N750A-100	NT-541	
C3	.05	400	E306A	DF-503		PT415	
C4	100		E311	D6-101	GP1K-101	UC-531	
C5	.05	400	E306A	DF-503		PT415	
C6	.0022	400	E3013	D6-222	GP2-333-222	PT6222	
C7	270		E314	D6-271	GP2K-271	UC-5327	
C8	.0047	400	E308	D6-472	GP2-333-472	PT6247	
C9	.01	600	E301	D6-103	GP3-333-103	PT611	
C10	.05	400	E306A	DF-503		PT415	
C11	.05	400	E306A	DF-503		PT415	
C12	.01	600	E301	D6-103	GP3-333-103	PT611	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SILVERTONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	2Meg	½	E2512	Q13-139	A47-2Meg-Z	AB-76	U-55	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	KB-1	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SILVERTONE PART No.	IRC PART No.	
R2	22KΩ	½		BTS-22K	
R3	680Ω	½		BTS-680	
R4	3.3Meg	½		BTS-3.3Meg	
R5	15KΩ	½		BTS-15K	Note 1
R6	10Meg	½		BTS-10Meg	

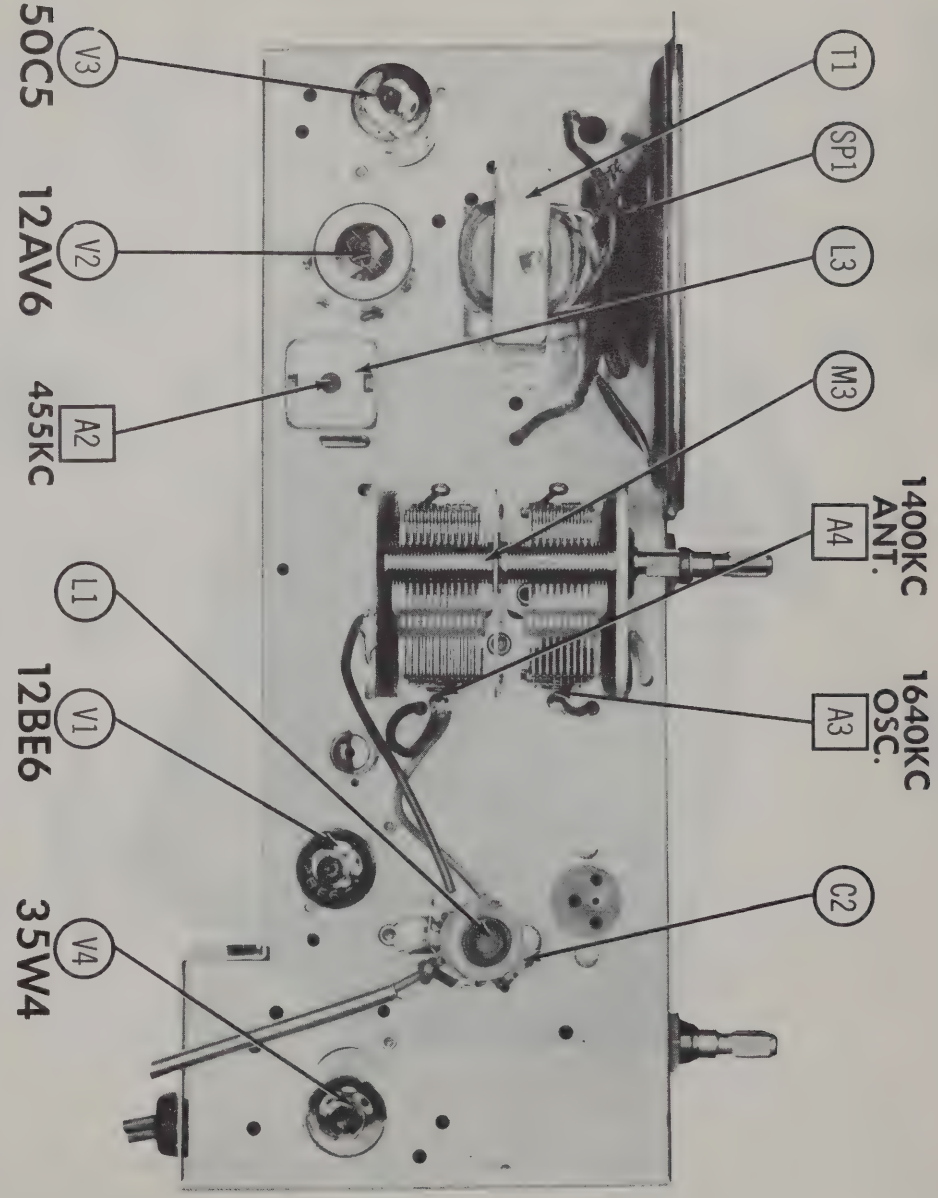
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SILVERTONE PART No.	IRC PART No.	
R7	470KΩ	½		BTS-470K	
R8	470KΩ	½		BTS-470K	
R9	120Ω	½		BTS-120	
R10	3300Ω	1		BTA-3300	
R11	22Ω	½		BTS-22	
R12	47Ω	2		BTB-47	

Note 1. Not used in some versions.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.4KΩ	3.3Ω	Part of Spkr.	Z1101	A-3025	A-3332	26S56 ①	S-12X	① Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SILVERTONE PART No.	QUAM PART No.	
SP1	4"	PM	3.3Ω	E103X	4A07	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	SILVERTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	9 8Ω	3Ω	E612				
L2	Osc. Coil	.6Ω	5.8Ω	E6122	14-1073 †		69-OSC ■	
L3	IF Trans.	20Ω *	20Ω	E623				

* Tapped @ 2.7Ω
† Leads sufficient mounting support.
■ Drill new mounting holes.

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	SILVERTONE PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	E812	51-2 *P-51-2	G-AG (J)	43 *2400	0-2 or S-2	* Complete tone arm and cartridge assembly

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

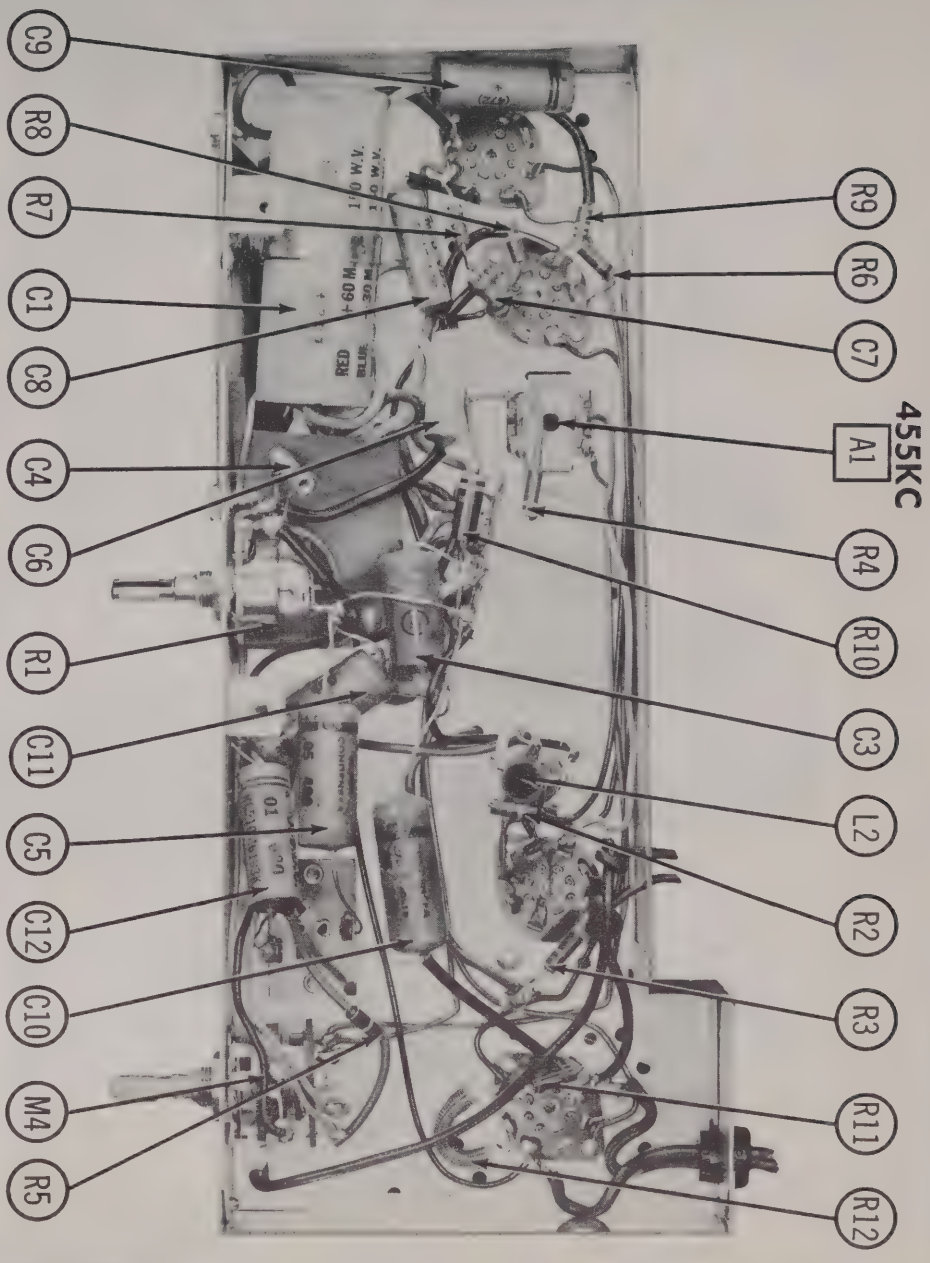
ITEM No.	REPLACEMENT DATA				REMARKS
	SILVERTONE PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M2	E813	*A-842 or †A-742 or ♦A-742D	*B-326 or †B-334 or ♦B-334D	*W-3AGA or †W-3AGS or ♦W-3AGD	* Metal † Jewel ♦ Diamond

MISCELLANEOUS

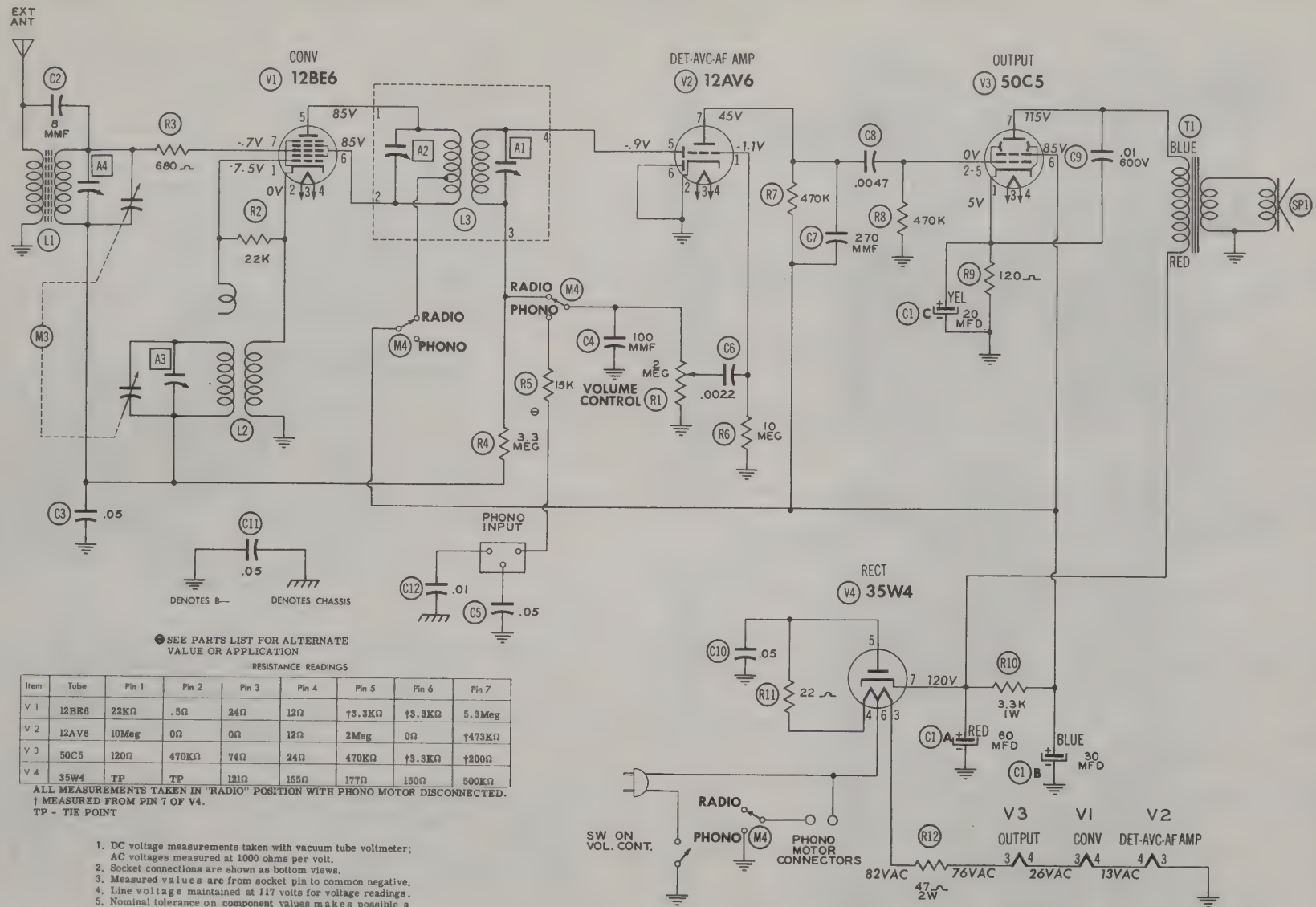
ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M3	Tuning Cap.	E3511	2 Gang (12-390MMF, 25-185MMF)
M4	Switch	E122	Radio-Phono (3PDT- Rotary type)
	Cabinet	E7013	
	Knob	E5025	Tuning
	Knob	E5010	On-off-volume & Radio-phono switch

PROPERTY OF
L. F. BLANKENSHIP
3944 NEWTON ST.
DENVER, COLORADO

CHASSIS—BOTTOM VIEW



SILVERTONE
Model 5032 (Ch. 757, 80000)



⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.5Ω	24Ω	12Ω	†3.3KΩ	†3.3KΩ	5.3Meg
V 2	12AV6	10Meg	0Ω	0Ω	12Ω	2Meg	0Ω	†473KΩ
V 3	50C5	120Ω	470KΩ	74Ω	24Ω	470KΩ	†3.3KΩ	†200Ω
V 4	35W4	TP	TP	121Ω	155Ω	177Ω	150Ω	500KΩ

ALL MEASUREMENTS TAKEN IN "RADIO" POSITION WITH PHONO MOTOR DISCONNECTED.
† MEASURED FROM PIN 7 OF V4.
TP - TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1955

IF=455KC

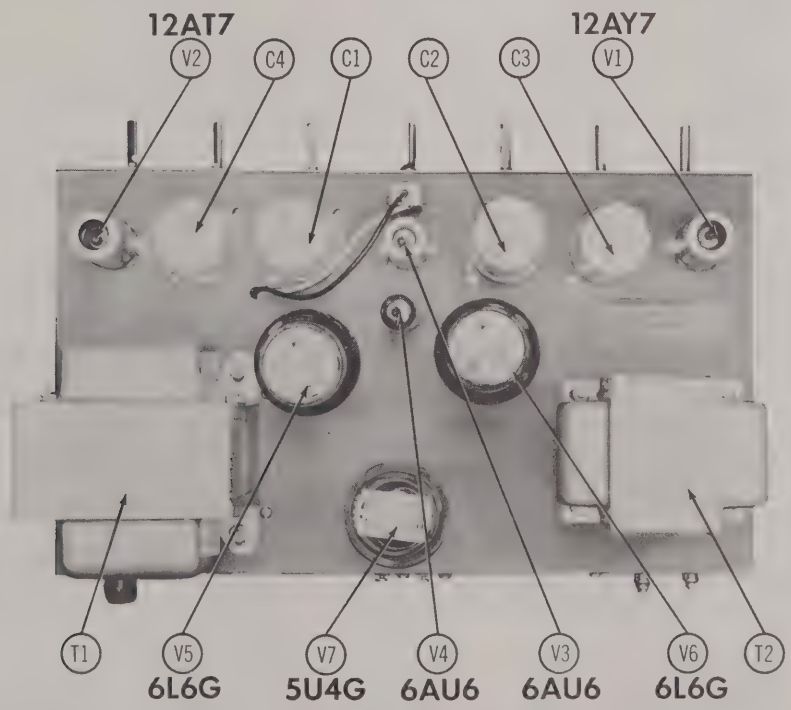
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

PROPERTY OF
L. F. CLANCENSHIP
3[illegible] MEADE ST.
DENVER, COLORADO

STROMBERG-CARLSON
MODEL AR-420 (Series 104)

STROMBERG-CARLSON
MODEL AR-420 (Series 104)

TRADE NAME	Stromberg-Carlson Model AR-420 (Series 104)
MANUFACTURER	Stromberg-Carlson Co., Sound Div., 1225 Clifford Ave., Rochester 21, N.Y.
TYPE SET	AC Operated 25 Watt 4 Channel Audio Amplifier
TUBES (Seven)	Types: 12AY7 Phono Preamp., 12AT7 AF Amp., 6AU6 AF Amp., 6AU6 Phase Inverter, (2) 6L6G Output, 5U4G Rectifier
POWER SUPPLY	105-125 Volts AC- 50/60 Cycles RATING 1.22 Amp. @ 117 Volts AC



HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

STROMBERG-CARLSON
Model AR-420 (Series 104)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		Stromberg-Carlson PART No.	STANDARD REPLACEMENT		
V1	Phono Pre-Amp.	12AY7	12AY7	9A	
V2	AF Amplifier	12AT7	12AT7	9A	
V3	AF Amplifier	6AU6	6AU6	7BK	
V4	Phase Inverter	6AU6	6AU6	7BK	
V5	Audio Output	6L6G	6L6G	7AC	
V6	Audio Output	6L6G	6L6G	7AC	
V7	Rectifier	5U4G	5U4G	5T	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	Stromberg-Carlson PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	▲30	500	46320	FP284	TM-D40-500	D-275	
B	■30	500					
C2A	■30	400	111601			Q-075	Note 1
B	▲40	475				FMD-1550	Note 1
C	▲50	50					
D	50	50					
C3A	▲20	450	111609	FP426	TM-4093	Q-300	Note 2
B	■15	450					Note 2
C	▲20	25					
D	20	25					Note 3
C4A	■15	450	111609	FP426	TM-4093	Q-300	Note 4
B	▲20	450					
C	▲20	25					Note 3
D	20	25					Note 3
C5	50	6		TC29	TD-50-6	MMT-650	
C6	50	6		TC29	TD-50-6	MMT-650	
C7	50	6		TC29	TD-50-6	MMT-650	

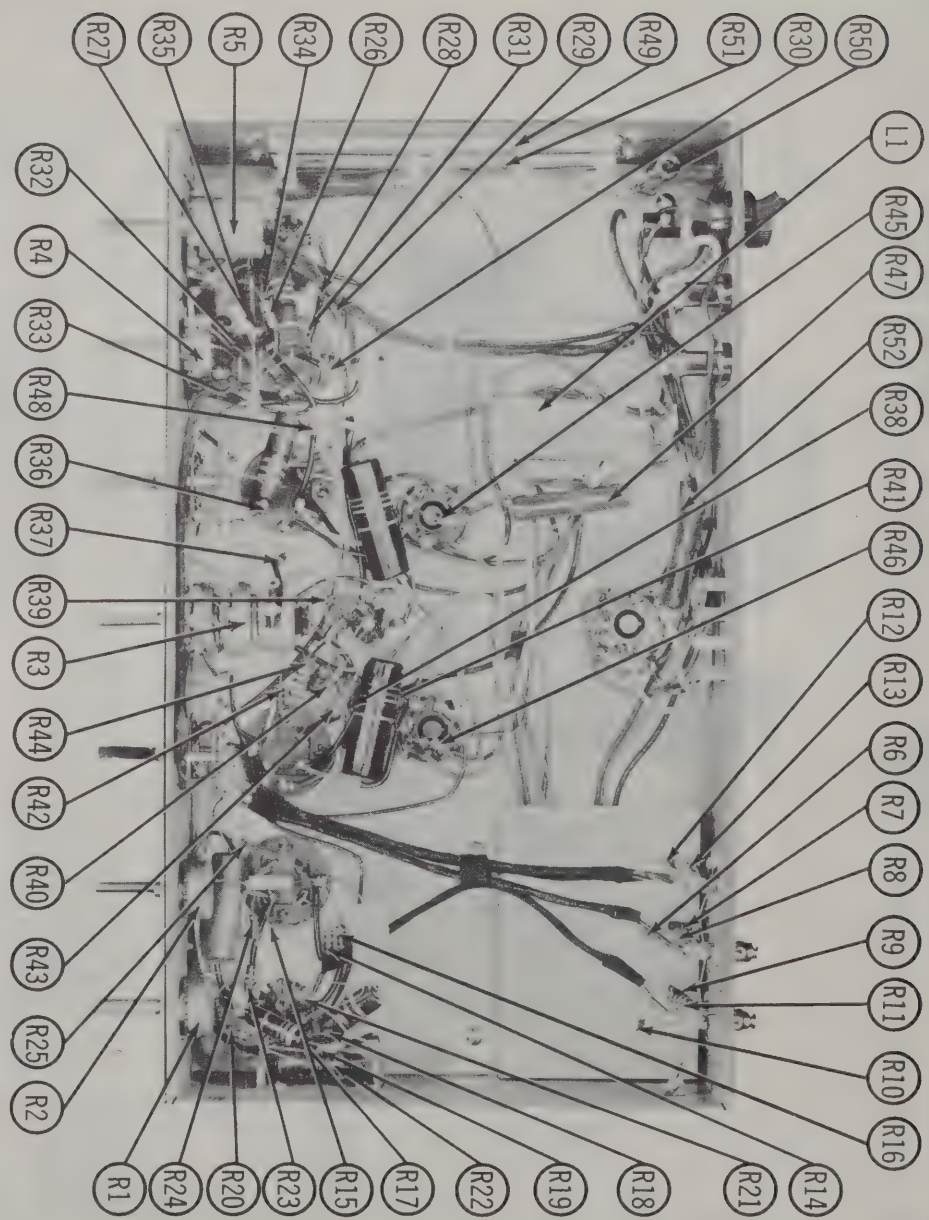
Note 1. Items C2A and C2B are reversed in some versions.
Note 2. Items C3A and C3B are reversed in some versions.
Note 3. Unused section.
Note 4. Some versions may use a 20MFD, 450V unit in this application.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	Stromberg-Carlson PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C8	.033	400		DF-303		PT4133	
C9	.022	400		DF-203	817-02	PT4122	
C10	.01	400		D6-104	GP3-333-103	PT411	
C11	.01	400		D6-104	GP3-333-103	PT411	
C12	470			D6-471	811-471		
C13	.0047	400		D6-472	GP2-333-472	PT6247	
C14	100			D6-101	801-101	ZT-531	
C15	.1	400		DF-104		PT401	
C16	220			D6-221	811-221		
C17	.0022	400		D6-222	GP2-333-222	PT6222	
C18	.033	400		DF-303		PT4133	
C19	.001	400		D6-102	GP2L-102	PT621	
C20	.01	400		D6-103	GP3-333-103	PT411	
C21	.1	400		DF-104		PT401	
C22	27			D6-270	831-270		
C23	.033	400		DF-303		PT4133	
C24	27			D6-270	831-270		
C25	220			D6-221	811-221		
C26	.22	400				PT4022	
C27	.22	400				PT4022	

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Stromberg-Carlson PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1Meg	½	145634	Q11-137	A47-1Meg-S	B-697	U-54	Turnover
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
R2A	1Meg	½	145634	Q11-137	A47-1Meg-S	B-697	U-54	De-Emphasis
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A
R3A	500KΩ	½	145622	Q11-133				
B	1Meg	½		M13-137				Volume
C	100KΩ	½		M13-128				
R4A	5Meg	½	145619	Q13-141	A47-5Meg-Z	AB-88	U-65	Bass
B	Shaft		Not Req.	Not Req.	FS-3	AK-3	Not Req.	Attach to R1A
R5A	1Meg	½	145635	Q13-137	A47-1Meg-Z	AB-70	U-53	Treble
B	Shaft		Not Req.	Not Req.	FS-3	AK-3	Not Req.	Attach to R5A
C	Switch		Not Req.	76-1	SWE-12	KB-1	US-26	Attach to R5A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Stromberg-Carlson PART No.	IRC PART No.	
R6	1Meg	½		BTS-1Meg	
R7	470KΩ	½		BTS-470K	
R8	470KΩ	½		BTS-470K	
R9	47KΩ	½		BTS-47K	
R10	220KΩ	½		BTS-220K	
R11	47KΩ	½		BTS-47K	
R12	470KΩ	½		BTS-470K	
R13	470KΩ	½		BTS-470K	
R14	220KΩ	½		BTS-220K	
R15	56KΩ	½		BTS-56K	
R16	8200Ω	½		BTS-8200	
R17	1Meg	½		BTS-1Meg	
R18	1Meg	½		BTS-1Meg	
R19	470KΩ	½		BTS-470K	
R20	220KΩ	½		BTS-220K	
R21	220KΩ	½		BTS-220K	
R22	22KΩ	½		BTS-22K	
R23	220KΩ	½		BTS-220K	
R24	5600Ω	½		BTS-5600	
R25	5.6Meg	½		BTS-5.6Meg	
R26	1Meg	½		BTS-1Meg	
R27	100KΩ	½		BTS-100K	
R28	56KΩ	½		BTS-56K	
R29	1500Ω	½		BTS-1500	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Stromberg-Carlson PART No.	IRC PART No.	
R30	56KΩ	½		BTS-56K	
R31	56KΩ	½		BTS-56K	
R32	220KΩ	½		BTS-220K	
R33	22KΩ	½		BTS-22K	
R34	56KΩ	½		BTS-56K	
R35	1500Ω	½		BTS-1500	
R36	100KΩ	1		BTS-100K	
R37	10KΩ	½		BTS-10K	
R38	22KΩ	½		BTS-22K	
R39	22KΩ	½		BTS-22K	
R40	220KΩ	½		BTS-220K	
R41	10KΩ	½		BTS-10K	
R42	1200Ω	½		BTS-1200	
R43	39KΩ	1		BTA-39K	
R44	39KΩ	1		BTA-39K	
R45	100KΩ	½		BTS-100K	
R46	100KΩ	½		BTS-100K	
R47	25Ω	10	149284	1 3/4A-25	
R48	56KΩ	½		BTS-56K	
R49A	1500Ω	10		1 3/4A-1500	
B	1500Ω	10	♦149622	1 3/4A-1500	
C	1000Ω	5		1 3/4A-1000	
R50	2500Ω	10		1 3/4A-2500	Note 1
R51	5000Ω	16	149621	2D-5000	Note 1
R52	125Ω	10	209289	1 3/4A-125	

Note 1. In some versions R50 and R51 are replaced with a single unit, 7500Ω, 25W.
♦ Items R49A, R49B, R49C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	Stromberg-Carlson PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC ⓐ1.22A	798VCT .170ADC	5VAC ⓐ 3A	6.3VAC ⓐ2.65A	161784	P-9402① ②	P-3155 ②	PC-8412① ②	24R07U②	R-21A ① ②

① Drill new mounting holes.
② Tape 6.3V CT.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Stromberg-Carlson PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6.6KΩ CT	16Ω tap ⓐ 8Ω,4Ω	161343						

FILTER CHOKE

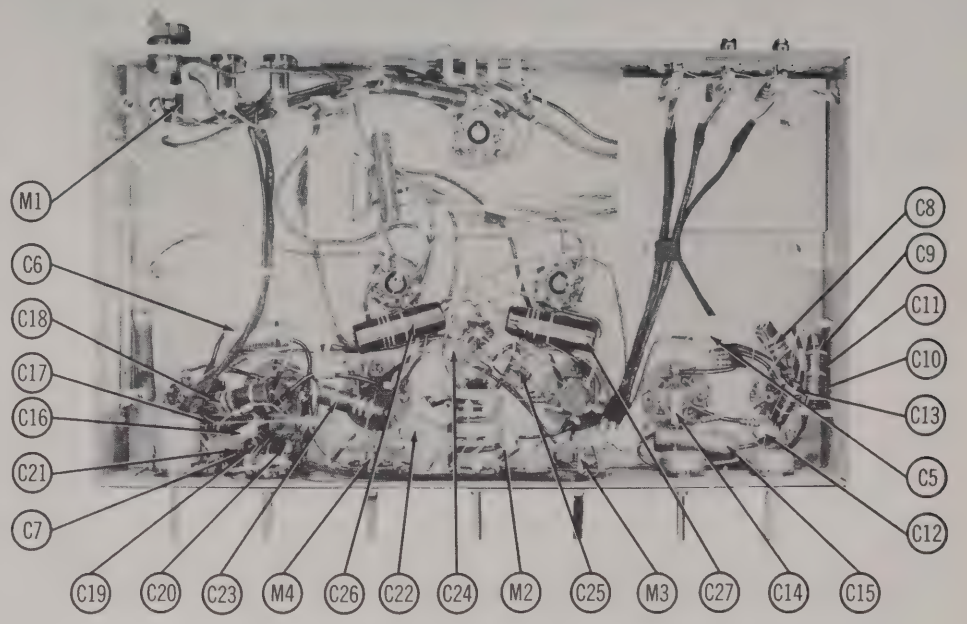
ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	Stromberg-Carlson PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L1	.005ADC	490Ω	12.6 HY	114186	C5004	C-2976	C-1215	20C52 ①	C-3K

① Drill one new mounting hole.

SET 301

FOLDER 10

CHASSIS—BOTTOM VIEW



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

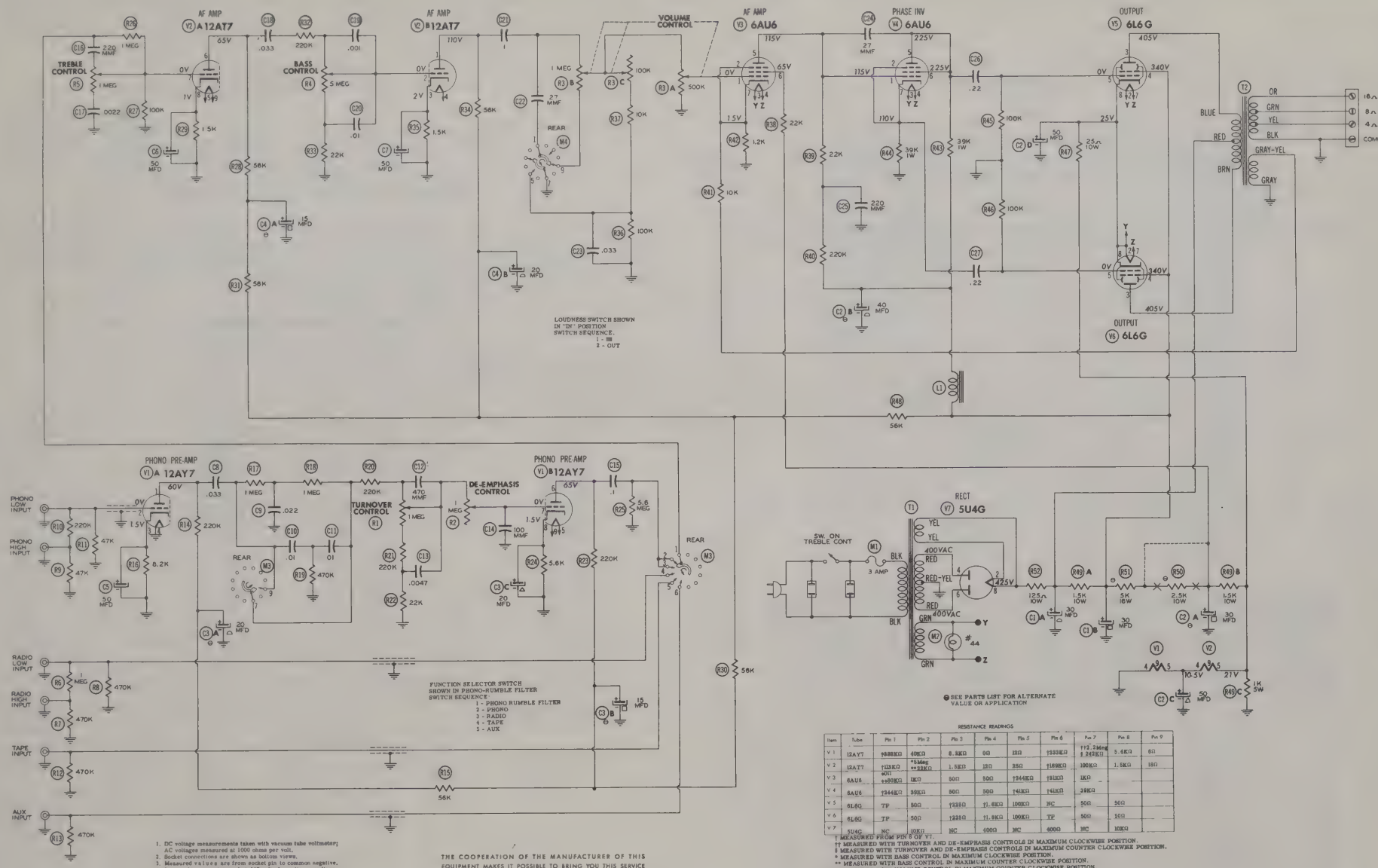
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Stromberg-Carlson PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	3A 250V			312003 (3AG 3A)	342001	AGC 3	HKP

MISCELLANEOUS

ITEM No.	PART NAME	Stromberg-Carlson PART No.	NOTES
M2	Pilot Light		#44
M3	Switch	158660	Selector (Rotary-wafer type)
M4	Switch	158661	Loudness (2 Pole-2 Position-Rotary)

STROMBERG-CARLSON
Model AR-420 (Series 104)

STROMBERG-CARLSON
Model AR-420 (Series 104)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings
6. All controls at minimum, proper output load connected.

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AY7	†283KΩ	40KΩ	8.5KΩ	0Ω	12Ω	†233KΩ	††2.2Meg † 242KΩ	5.6KΩ	6Ω
V 2	12AT7	†113KΩ	*34meg **22KΩ	1.5KΩ	12Ω	25Ω	†169KΩ	100KΩ	1.5KΩ	18Ω
V 3	6AU6	+0Ω ++80KΩ	1KΩ	50Ω	50Ω	†244KΩ	†31KΩ	1KΩ		
V 4	6AU6	†344KΩ	39KΩ	50Ω	50Ω	†41KΩ	†41KΩ	39KΩ		
V 5	6L6G	TP	50Ω	†225Ω	†1.6KΩ	100KΩ	NC	50Ω	50Ω	
V 6	6L6G	TP	50Ω	†225Ω	†1.6KΩ	100KΩ	TP	50Ω	50Ω	
V 7	5U4G	NC	10KΩ	NC	400Ω	NC	400Ω	NC	10KΩ	

† MEASURED FROM PIN 8 OF V1.
†† MEASURED WITH TURNOVER AND DE-EMPHASIS CONTROLS IN MAXIMUM CLOCKWISE POSITION.
‡ MEASURED WITH TURNOVER AND DE-EMPHASIS CONTROLS IN MAXIMUM COUNTER CLOCKWISE POSITION.
* MEASURED WITH BASS CONTROL IN MAXIMUM CLOCKWISE POSITION.
** MEASURED WITH BASS CONTROL IN MAXIMUM COUNTER CLOCKWISE POSITION.
+ MEASURED WITH VOLUME CONTROL IN MAXIMUM COUNTER CLOCKWISE POSITION.
++ MEASURED WITH VOLUME CONTROL IN MAXIMUM CLOCKWISE POSITION.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1955

PHOTOFACT* Folder

TRAV-LER MODELS 517-82, 521-79, -80, -81, -R90, -R91, 5210-60, -61 (Ch. 412E4, 412E5, 412G5)

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

PROPERTY OF
C. F. SKAMIENSHIP
3000 [illegible] ST.
DENVER, COLORADO

MODEL 521-80

TRAV-LER MODELS 517-82, 521-79, -80, -81, -R90, -R91, 5210-60, -61 (Ch. 412E4, 412E5, 412G5)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

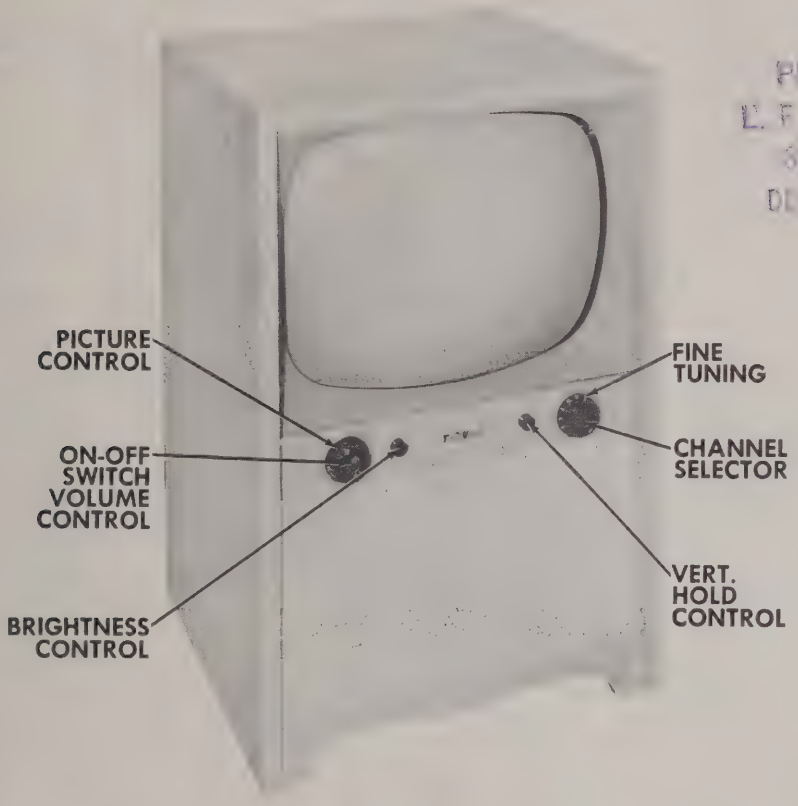
"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 12-55 SET 301 FOLDER 11

PHOTOFACT* Folder

TRAV-LER MODELS 517-82, 521-79, -80, -81, -R90, -R91, 5210-60, -61 (Ch. 412E4, 412E5, 412G5)

PROPERTY OF
L. F. [illegible]
[illegible]
DENVER, COLORADO



TRAV-LER MODEL 521-80

TRADE	Trav-Ler	MODELS	CHASSIS
		517-82, 521-74, 521-79, 521-80, 521-81, 5210-60, 5210-61	412E4, 412E5
		521-R90, 521-R91	412G5
MANUFACTURER	Trav-Ler Radio Television Corp., 571 W. Jackson Blvd., Chicago, Illinois		
TYPE SET	Television Receiver		
TUBES	Twenty-one		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.64 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13, Video IF 26.25MC, Sound IF 21.75MC (Intercarrier)		

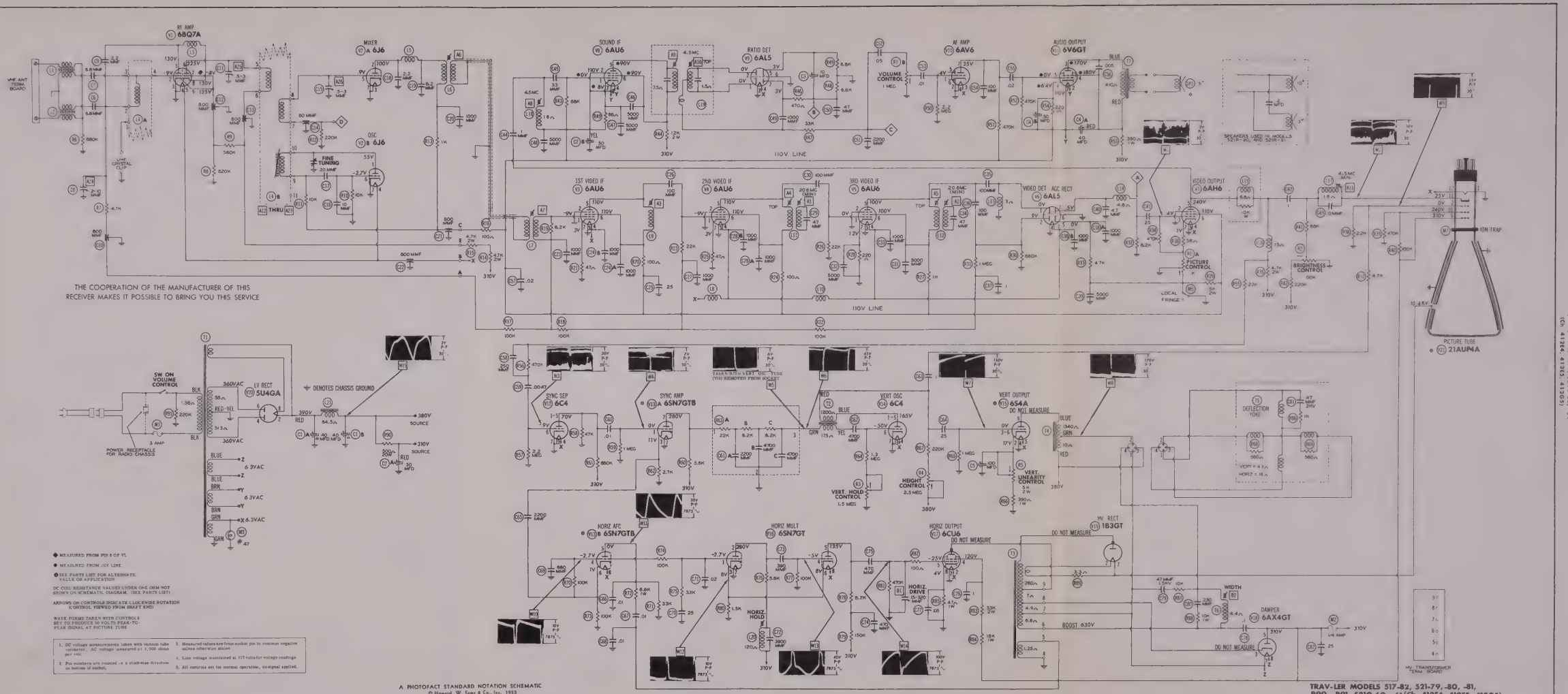
INDEX

Alignment Instructions 6, 7
Drive Cord Stringing (Radio) 16
Disassembly Instructions 18
Horizontal Sweep Circuit Adjustments 11
Parts List and Descriptions 14, 15, 16
Photographs
Cabinet-Rear View 11
Capacitor Identification 4, 9
Chassis-Top View 3
RF Tuner 10
Resistor Identification 19, 20
Photographs (Cont)
Trans., Inductor & Alignment Identification 17
Resistance Measurements 8
Servicing in the Field 18
Schematic (Radio) 13
Schematic (TV) 2
Trouble Shooting Aids 12, 17
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

TRAV-LER MODELS 517-82, 521-79, -80, -81, -R90, -R91, 5210-60, -61 (Ch. 412E4, 412E5, 412G5)

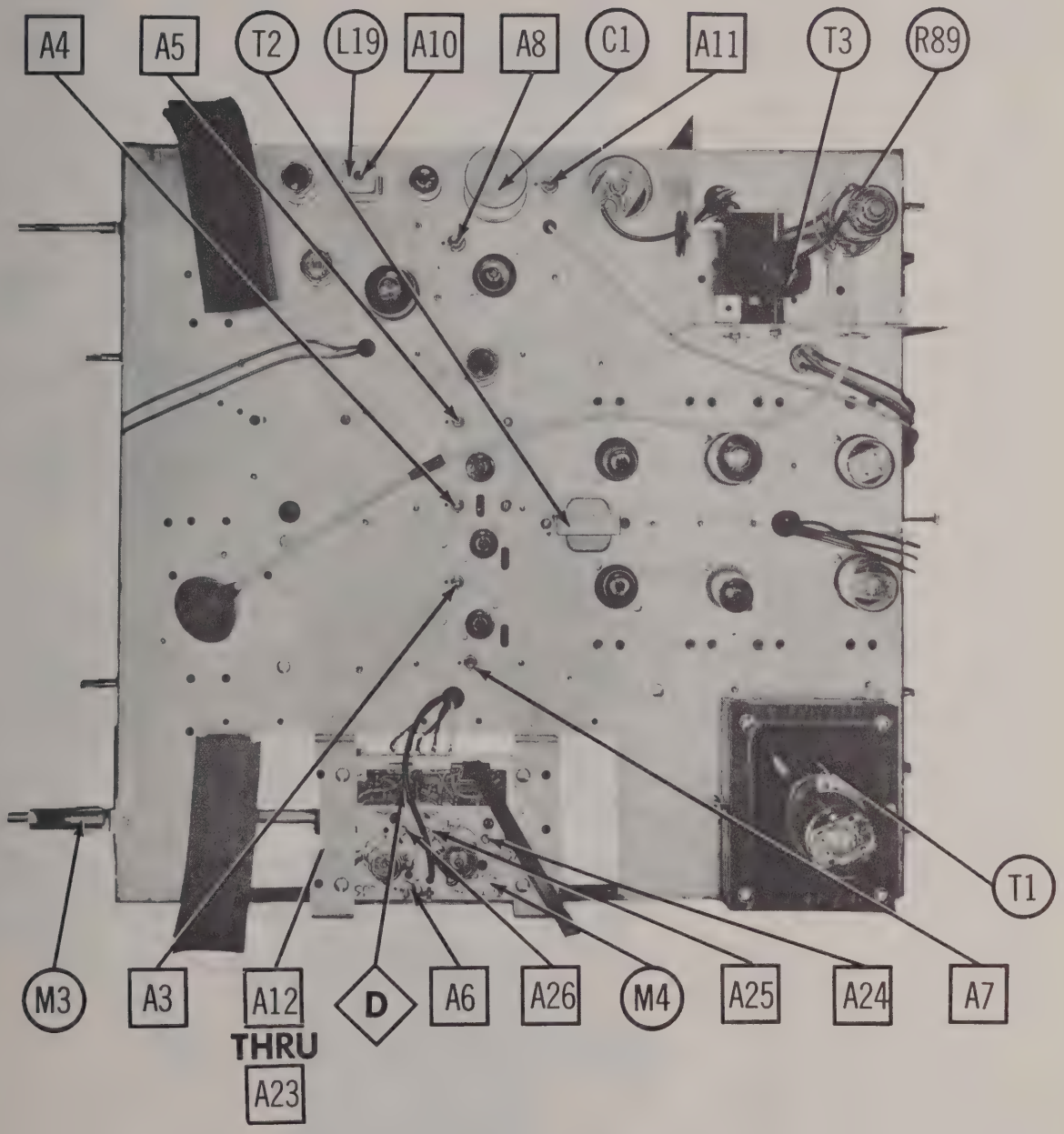
HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America


THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
RF AMP V1 6BQ7A
MIXER V2 A 6J6
OSC V2 B 6J6
SOUND IF V3 6AU6
RATIO DET V5 6AL5
AF AMP V10 6AV6
AUDIO OUTPUT V11 6V6GT
1ST VIDEO IF V3 6AU6
2ND VIDEO IF V4 6AU6
3RD VIDEO IF V5 6AU6
VIDEO DET AGC RECT V6 6AL5
VIDEO OUTPUT V7 6AH6
PICTURE TUBE V21 21AUP4A
ION TRAP
SYNC SEP V13 A 6C4
SYNC AMP V13 A 6SN7GTB
VERT OSC V14 6C4
VERT OUTPUT V15 6S4A
HORIZ AFC V13 B 6SN7GTB
HORIZ MULT 6SN7GT
HORIZ OUTPUT V17 6CL6
HV RECT V19 1B3GT
DAMPER V18 6AX4GT
LV RECT V20 5U4GA
SW ON VOLUME CONTROL
POWER RECEPTACLE FOR RADIO CHASSIS
DENOTES CHASSIS GROUND
110V LINE
VOLUME CONTROL 1 MEG
FINE TUNING
LOCAL FRINGE
PICTURE CONTROL
BRIGHTNESS CONTROL
VERT. HOLD CONTROL 1.5 MEG
HEIGHT CONTROL 2.5 MEG
VERT LINEARITY CONTROL
HORIZ HOLD
HORIZ DRIVE
WIDTH
BOOST 630V
DEFLECTION YOKE
SPEAKERS USED IN MODELS 521R-90, AND 521R-91
HV TRANSFORMER TERM BOARD
DO NOT MEASURE
◆ MEASURED FROM PIN 8 OF V1.
◆ MEASURED FROM 30V LINE
● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings
5. All controls set for normal operation, no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1955
TRAV-LER MODELS 517-82, 521-79, -80, -81, -R90, -R91, 5210-60, -61 (Ch. 412E4, 412E5, 412G5)

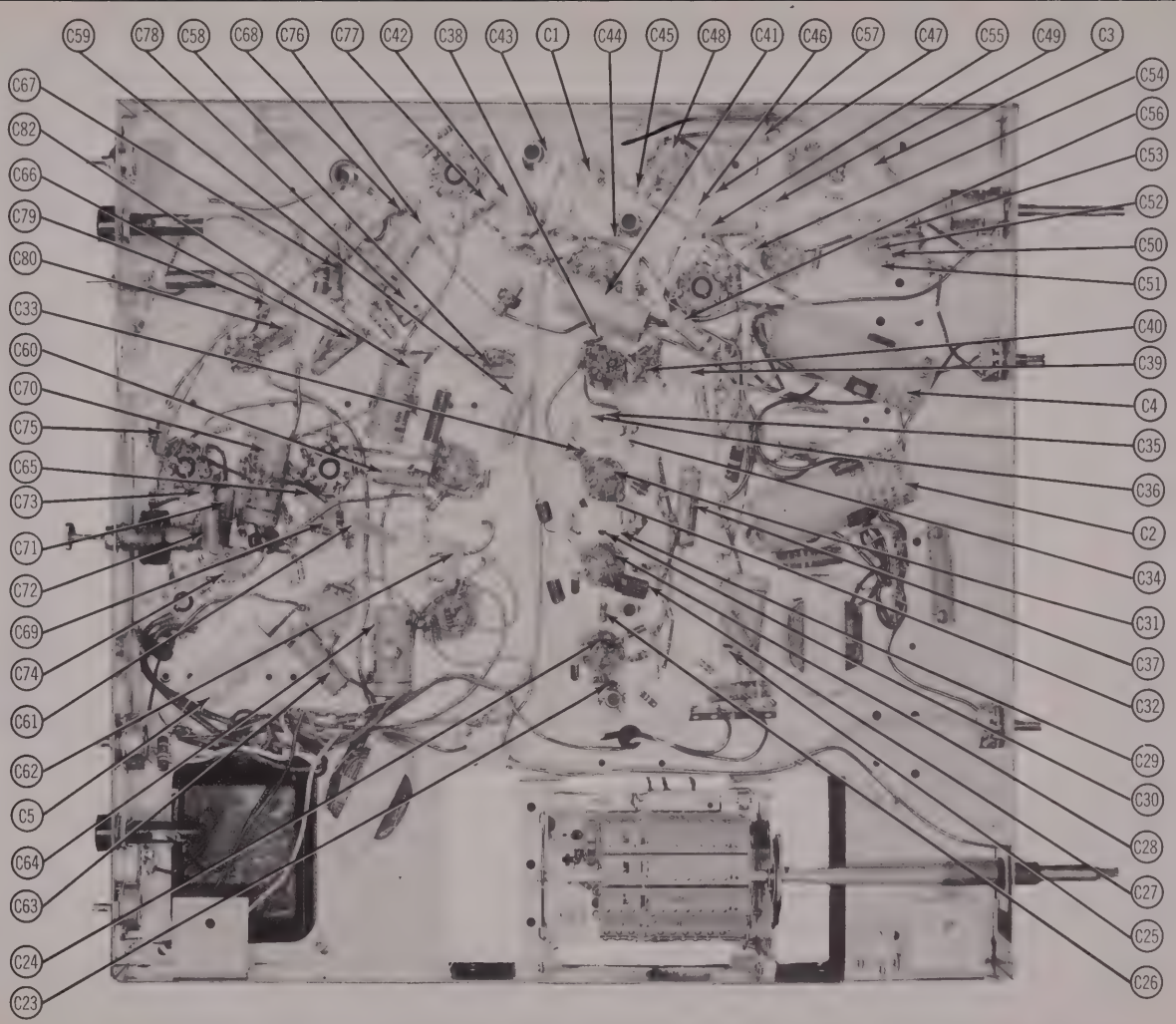
TRAV-LER MODELS 517-82, 521-79, -80, -81, -R90, -R91, 5210-60, -61 (Ch. 412E4, 412E5, 412G5)

PROPERTY OF
L. F. HEATH RESEARCH
3924 MEAD ST.
DENVER, COLORADO



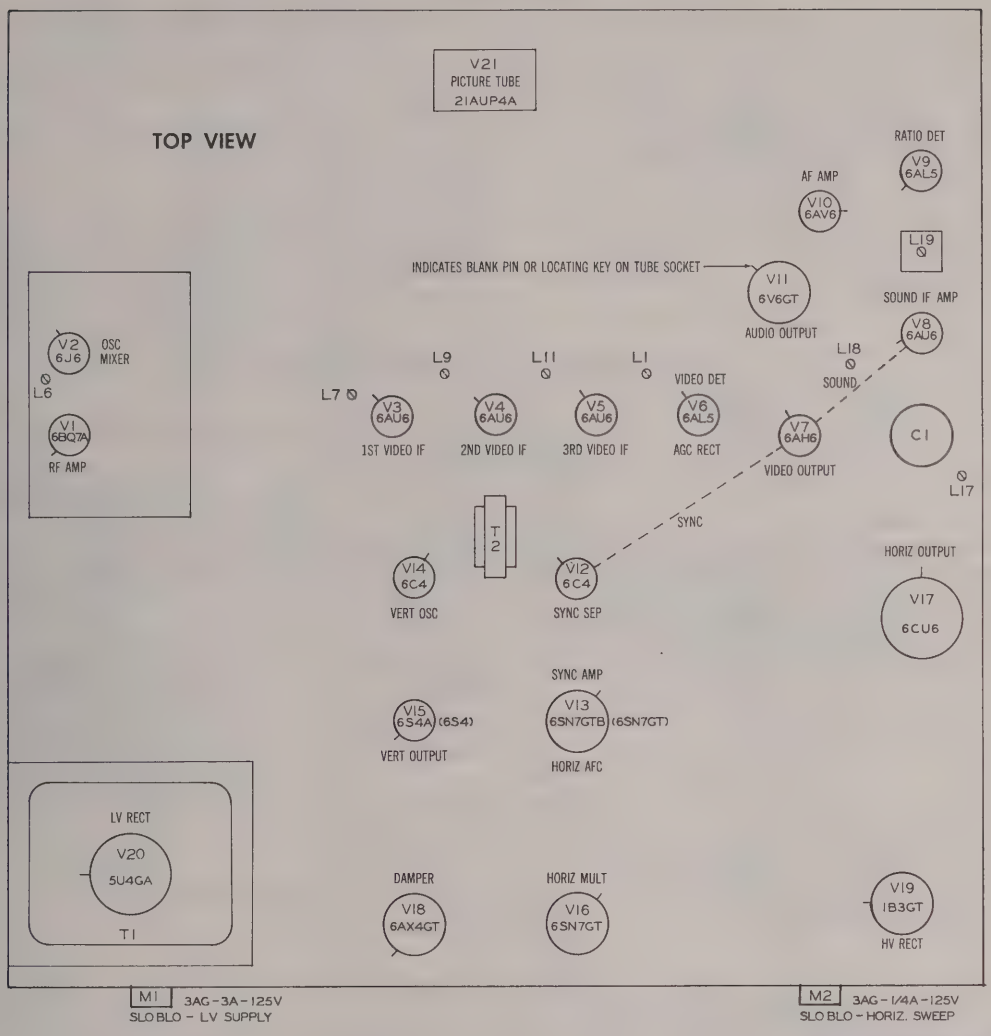
CHASSIS TOP VIEW

SET 301 FOLDER 11



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V20, Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6, V7, V11
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V7, V21
Has pic, no sound - V8, V9, V10, V11

SYNC FAILURE
No vert. sync - V13, V14
No horiz. sync - V13, V16
No vert. or horiz. sync - V12, V13

SWEEP FAILURE
No raster, has sound - V16, V17, V18, V19, V21, Fuse (M2)
No vertical deflection - V14, V15
Poor vert. linearity or foldover - V14, V15
Poor horiz. linearity or foldover - V16, V17, V18
Narrow picture - V16, V17, V18, V19, V20
Vert. off freq. - V13, V14
Horiz. off freq. - V13, V16

PROPERTY OF
D. F. BLANKENSHIP
3924 MEADE ST
DENVER, COLO.

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from chassis. Do not remove the horizontal multivibrator tube (V16) to disable the high voltage.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt battery to the ungrounded side of C37. Connect the positive lead to chassis. Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to pin 1 (grid) of 6AU6 (V3). Low side to chassis.	Not used	20.6MC (Unmod)	12	Use VTVM. DC probe to point (A). Common to chassis.	A1, A2	Adjust for MINIMUM deflection.
2.	"	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	20.6MC 21.75MC 22.75MC 26.25MC	Any	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A3, A4, A5, A6, A7	If necessary, reduce bias to 1.5 volts to obtain usable pattern on scope. Adjust A3 thru A7 to obtain response similar to Fig. 1. A3 affects the video side of response and A4 affects audio side of response curve. A5 affects intermediate range of response curve. Adjust A6 and A7 for proper symmetry, flatness and bandwidth.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
3.	Direct	High side to point (A). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe to point (B). Common side to chassis.	A8, A9	Adjust for MAXIMUM deflection.
4.	"	"	"	"	DC probe to point (C). Common side to chassis.	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.	Direct	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (B). Low side to chassis.	A8, A9	Disconnect stabilizing capacitor C3. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
4.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A10	Reconnect stabilizing capacitor C3. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

Set contrast control for maximum.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	Direct	High side to point (A). Low side to chassis.	4.5MC (Unmod.)	Any	DC probe thru detector (Fig. 4) to pin 11 (cathode) of picture tube. Common to chassis.	A11	Adjust for MINIMUM deflection.

OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket.
The channel oscillator adjustment screws are reached through a hole just above and to the left of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50Ω.
Set the fine tuning control to the mid-range of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Two 120Ω Carbon Resistor	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A12	Adjust to place video marker at 50% on response curve with sound marker as shown in Fig. 5.
			213MC (10MC Swp)	211.25MC 215.75MC	13		A13	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A14	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A15	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A16	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A17	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A18	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A19	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A20	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A21	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A22	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A23	

ALIGNMENT INSTRUCTIONS (cont)

RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characterisitc impedance, usually 50Ω.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point (D). Low side to chassis.	A24, A25, A26	Adjust for response curve similar to Fig. 6 with markers above 90%.
8.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		If markers fall below 90% on any channel make compromise adjustment of A24, A25 and A26 with channel switch set to that channel, then check all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

RADIO ALIGNMENT

Set volume control fully clockwise.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
9.	.1MFD	High side to pin 7 (grid) of 12BE6. Low side to B-.	455KC	Radio	Tuning gang fully open.	Across voice coil	A27, A28 A29, A30	Adjust for MAXIMUM deflection.
10.		Loop	1610KC		"	"	A31	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
11.		"	540KC		Tuning gang fully closed.	"	A32	Adjust for MAXIMUM deflection. Repeat step 2.
12.		"	1400KC		Tune to 1400KC signal.	"	A33	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

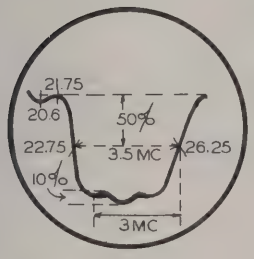


FIG. 1

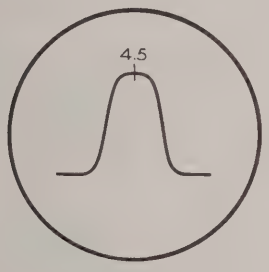


FIG. 2

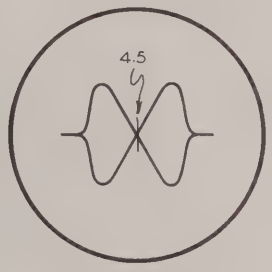


FIG. 3

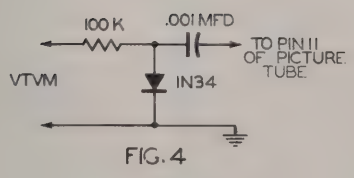


FIG. 4

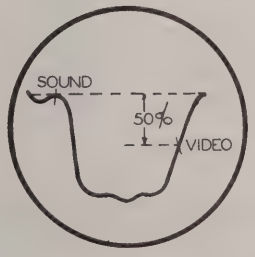


FIG. 5

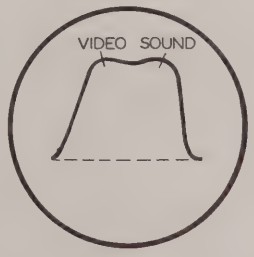


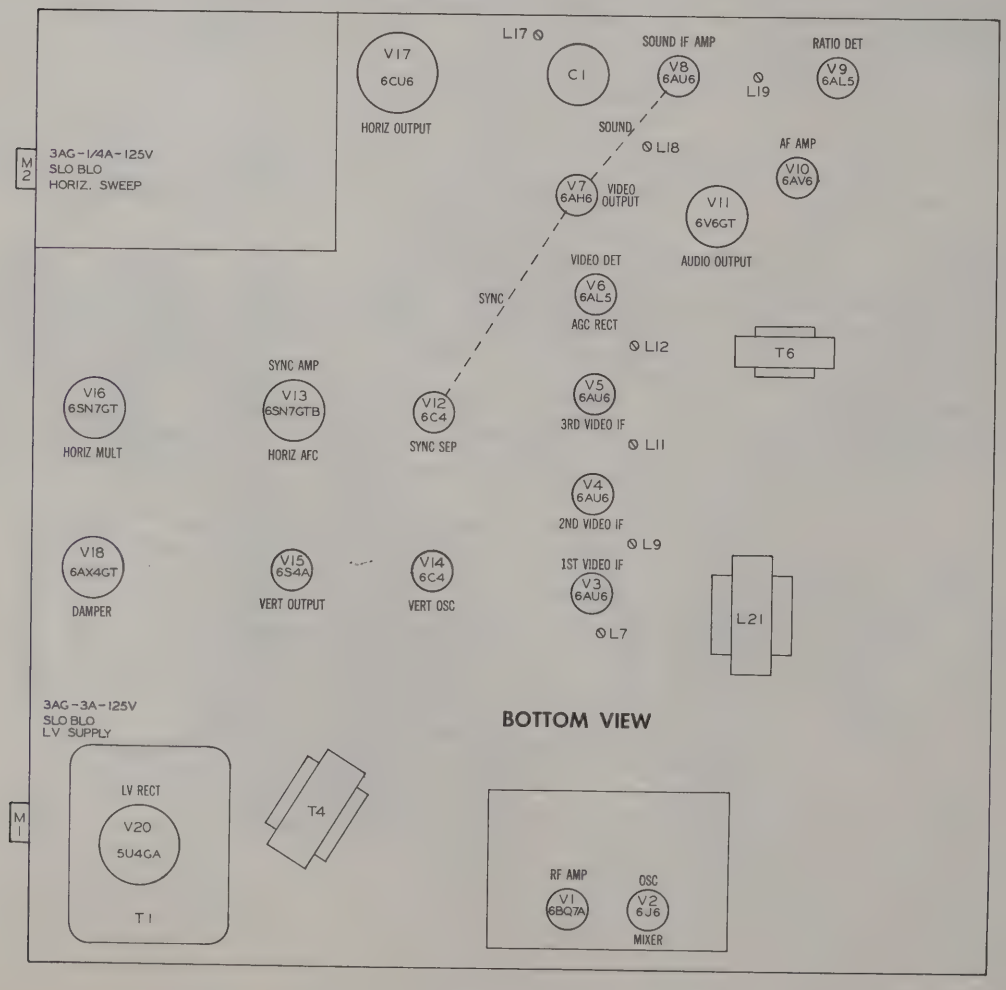
FIG. 6

PROPERTY OF
E. F. BLANKENSHIP

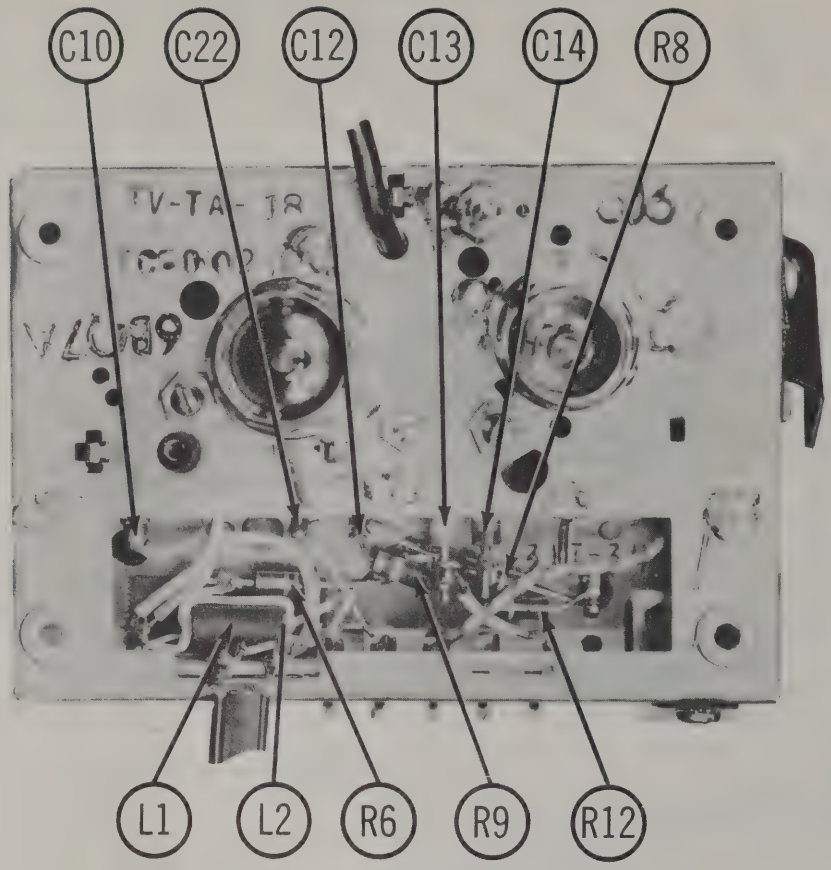
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	INF	2Meg	0Ω	0Ω	. 1Ω	†10KΩ	400KΩ	INF	400KΩ
V 2	6J6	■10KΩ	■1. 1KΩ	0Ω	. 1Ω	220KΩ	10KΩ	0Ω		
V 3	6AU6	2Meg	0Ω	0Ω	. 1Ω	■100Ω	■100Ω	47Ω		
V 4	6AU6	2Meg	0Ω	0Ω	. 1Ω	■100Ω	■100Ω	47Ω		
V 5	6AU6	22KΩ	0Ω	0Ω	. 1Ω	■1KΩ	■1KΩ	220Ω		
V 6	6AL5	3Ω	700KΩ	. 1Ω	0Ω	5KΩ	0Ω	8. 2KΩ		
V 7	6AH6	470KΩ	0Ω	0Ω	. 1Ω	†5. 2KΩ	15KΩ	80Ω		
V 8	6AU6	■68KΩ	15KΩ	15KΩ	15KΩ	†13KΩ	†13KΩ	■68Ω		
V 9	6AL5	INF	INF	0Ω	. 1Ω	6. 8KΩ	0Ω	6. 8KΩ		
V 10	6AV6	2. 2Meg	0Ω	. 1Ω	0Ω	NC	NC	■470KΩ		
V 11	6V6GT	NC	15KΩ	†1. 3KΩ	†900Ω	■470KΩ	TP	15KΩ	■220Ω	
V 12	6C4	†140KΩ	NC	0Ω	. 1Ω	†140KΩ	2. 2Meg	0Ω		
V 13	6SN7GTB	1Meg	†6. 2KΩ	2. 7KΩ	200KΩ	33KΩ	100KΩ	0Ω	. 1Ω	
V 14	6C4	†1. 2Meg	TP	0Ω	. 1Ω	†1. 2Meg	2Meg	0Ω		
V 15	6S4A	NC	900Ω	1Meg	0Ω	. 1Ω	1Meg	NC	NC	†1. 4KΩ
V 16	6SN7GT	300KΩ	†6. 2KΩ	1. 5KΩ	100KΩ	†160KΩ	1. 5KΩ	0Ω	. 1Ω	
V 17	6CU6	NC	. 1Ω	NC	†50KΩ	470KΩ	TP	0Ω	47Ω	TOP CAP ▲7Ω
V 18	6AX4GT	NC	NC	INF	NC	†600Ω	NC	INF	INF	
V 19	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲267Ω
V 20	5U4GA	INF	50KΩ	INF	52Ω	INF	55Ω	INF	50KΩ	
V 21	21AUP4A	0Ω	2. 2KΩ	PIN 6 †600Ω	PIN 10 †100KΩ	PIN 11 †200KΩ	PIN 12 . 1Ω			

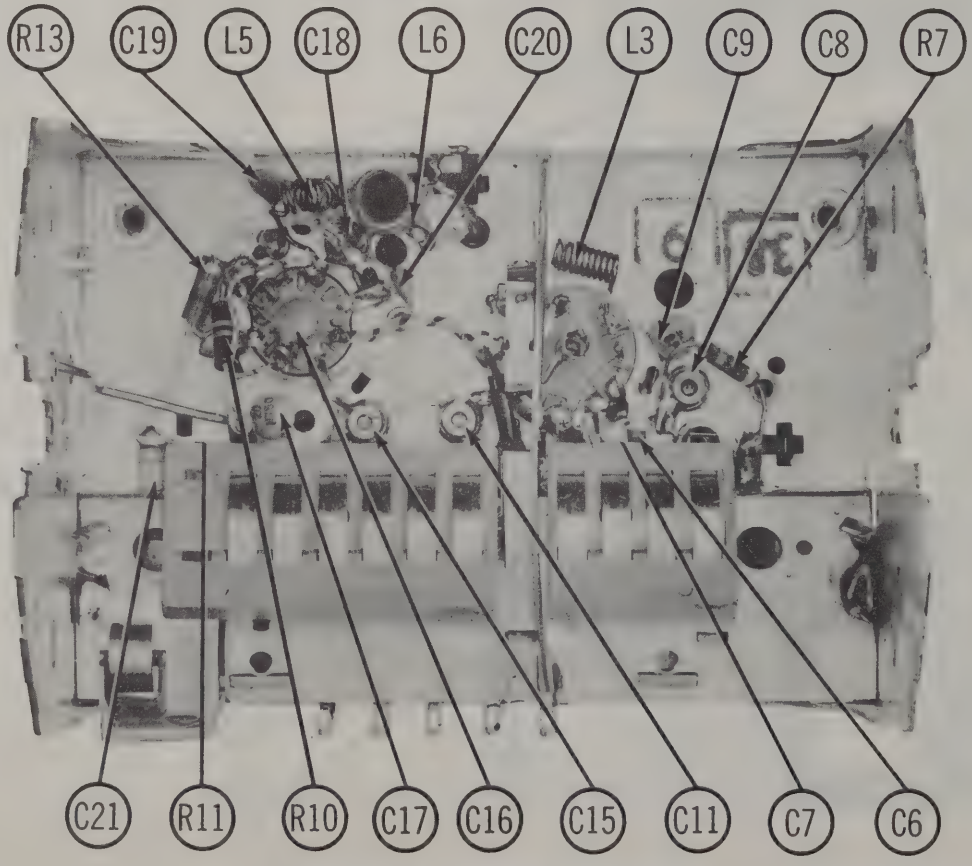
†MEASURED FROM PIN 2 OF V20.
■MEASURED FROM 110 V LINE.
▲MEASURED FROM PIN 3 OF V18.
NC-NO CONNECTION.
TP-TIE POINT.



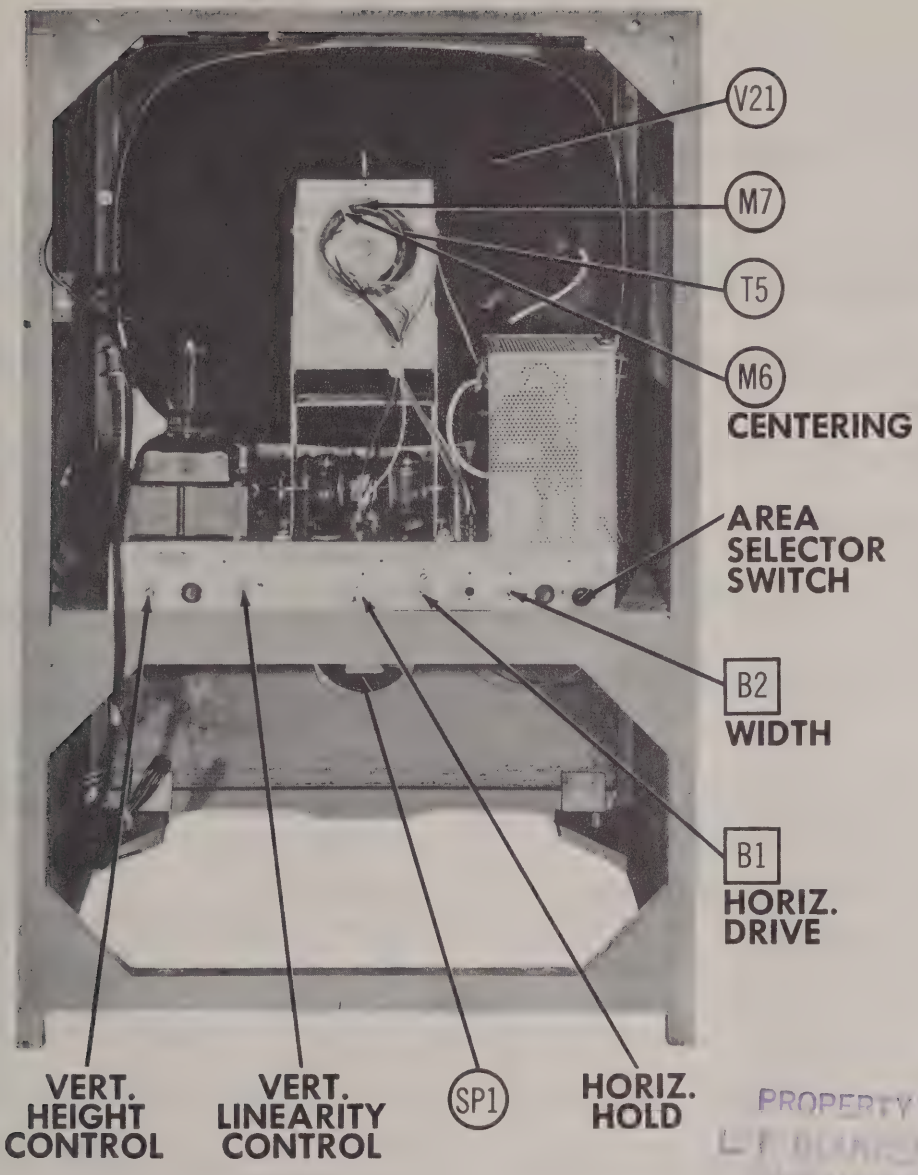
TUBE PLACEMENT CHART



RF TUNER-TOP VIEW



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

PROPERTY OF
[illegible]
DENVER, COLORADO

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Adjust the horizontal oscillator slug of L20 until the picture synchronizes horizontally. Momentarily remove the signal by switching off channel and back again. If picture does not pull into sync, slightly retouch slug adjustment. Repeat this procedure until proper sync action is obtained.

Adjust the horizontal drive trimmer (B1) counter clockwise as far as possible without the presence of vertical white lines or compression near the center of the picture.

Adjust the width slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V17, V18 and V20. Check adjustments B1 and B2. Check T3, T5A, R83, R84, C75 and other associated components.

DRIVE LINES

Check by substitution V17 and V18. Check adjustment B1. Check C75, R83, R84, R85, T3, T5A and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V17 and V18. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V16, V17 and V18. Check C71 for open. Check L20, C69, C70, R75, R76 and other associated components.

XMAS TREE EFFECT

Check by substitution V16, V17 and V18. Check T3 and T5 for internal arcing. Check L20, C66, C67, C68, C73, R80 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V14 and V15. Check waveform W7.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R66, C5 and other associated components.	Check T2, C63, C64, R64, R67, R4 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V14 and V15. Check height and vertical linearity controls for proper operation. Check R67, T4 and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V14 and V15. Check R67, R4, C64, T2 and other associated components.

COMPRESSED AT TOP

Check by substitution V14 and V15. Check R66, R5, C5, C64, T4, T5B and other associated components.

FOLDS

Check by substitution V14 and V15. Check C64, T2, T4, T5B, R66 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V12 and V13. Check C58, C59, C60, R58, R60, R61 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V14. Check vertical integrator network. Check T2, C62, R64, R3 and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V13 and V16. Check C65, C69, C70, C71, L20, R76, and other associated components.

HORIZONTAL BENDING

Check by substitution V12, V13 and V16. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V7. Check C41, C42, R35, L16 and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A-11. Check video IF alignment.

POOR CONTRAST

Substitute V7. Check C41, C42, L15, R35 and other associated components.

NEGATIVE PICTURE

Substitute V7. Check picture tube. Check L14, L15, C41, C42 and other associated components.

SMEAR

Substitute V7. Check L14, L15, R35, R36, C41, C42 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5, V6 and V7 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V8, V9, V10 and V11. Check stages V10 and V11 using audio signal generator. Apply audio signal across R1B.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value.	Check C51, C52, C53, C54, C55, C56, C4A, C4B, R51, R52, R53, R54, T7, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A10 for minimum buzz. If still unsatisfactory, check Sound IF alignment.

DISTORTED

Follow procedure outlined under "Weak or no Sound".

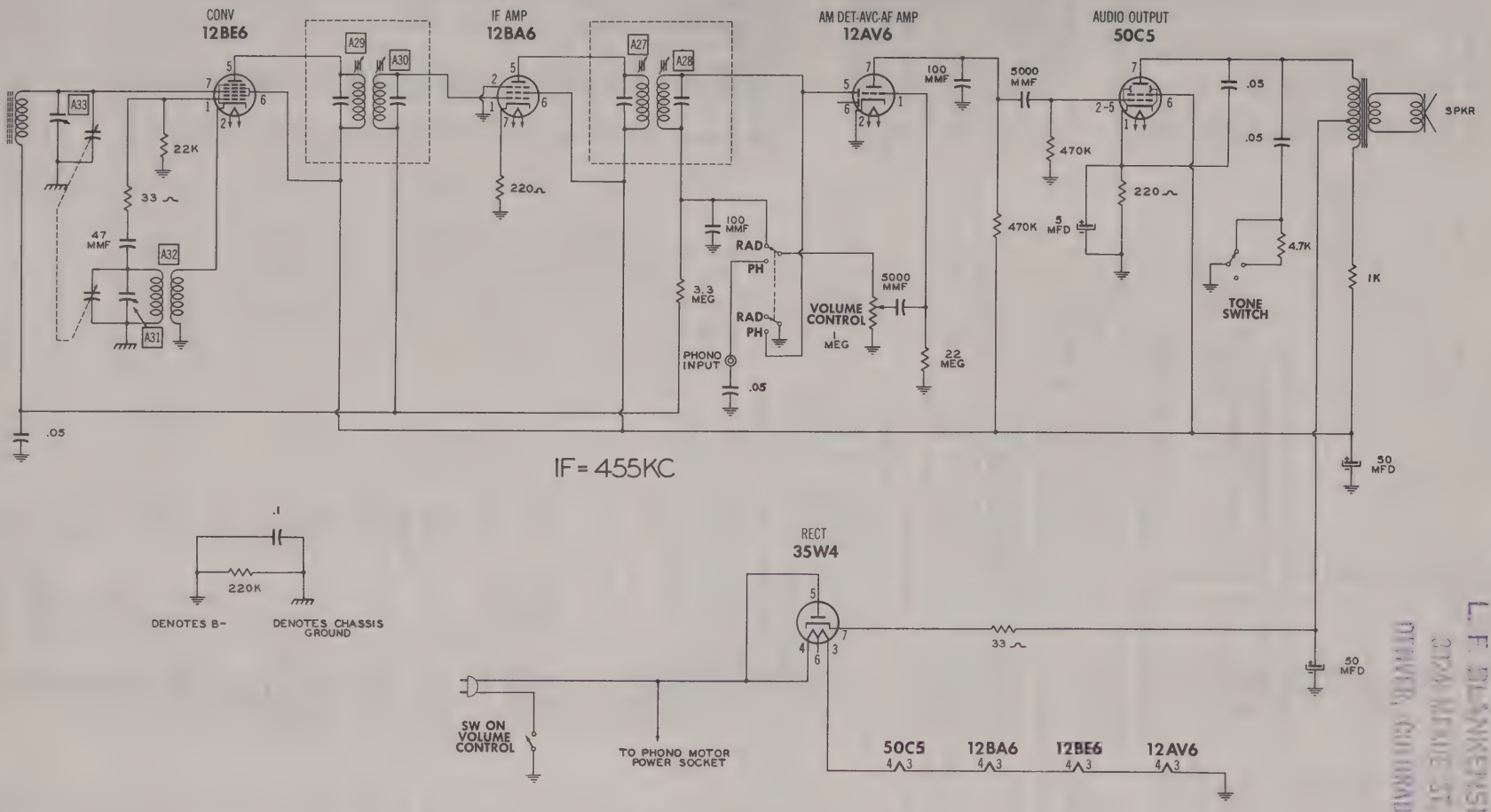
POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. Check fuse, M1. If filaments light, substitute V20. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Substitute V20. Check B+ filter and decoupling network.



RADIO CHASSIS USED WITH CHASSIS 412G5

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1955

PROPERTY OF
L. F. BLANKENSHIP
3124 MONROE ST.
DENVER, COLORADO

RADIO SCHEMATIC

TRAV-LER MODELS 517-82, 521-79, -80, -81, -R90, -R91, 5210-60, -61 (Ch. 412E4, 412E5, 412G5)

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No	USE	REPLACEMENT DATA: TRAV-LER PART No.	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BQ7A	6BQ7A	9AJ	
V2	Mixer-Osc.	6J6	6J6	7BF	
V3	1st Video-IF Amp.	6AU6	6AU6	7BK	
V4	2nd Video-IF Amp.	6AU6	6AU6	7BK	
V5	3rd Video-IF Amp.	6AU6	6AU6	7BK	
V6	Video Det., AGC Rectifier	6AL5	6AL5	6BT	
V7	Video Output	6AH6	6AH6	7BK	
V8	Sound IF Amp.	6AU6	6AU6	7BK	
V9	Ratio Det.	6AL5	6AL5	6BT	
V10	AF Amplifier	6AV6	6AV6	7BT	
V11	Audio Output	6V6GT	6V6GT	7AC	
V12	Sync Separator	6C4	6C4	6BG	
V13	Sync Amp., Horiz. AFC	6SN7GTB	6SN7GTB	8BD	6SN7GT used as an alternate
V14	Vert. Osc.	6C4	6C4	6BG	
V15	Vert. Output	6S4A	6AC7	5AC	6S4 used as an alternate
V16	Horiz. Mult.	6SN7GT	6SN7GT	8BL	
V17	Horiz. Output	6CU6	6CU6	6AM	
V18	Damper	6AX4GT	6AX4GT	6CG	
V19	HV Rectifier	1B3GT	1B3GT	5C	
V20	LV Rectifier	5U4GA	5U4GA	5T	

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: TRAV-LER PART No	C&S PART No	GENERAL ELECTRIC PART No	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V21	21AUP4A ②	21AUP4A ②		21AUP4A ②	21AUP4A ①	12L	① Aluminized
				21ALP4	21ALP4	12L	② Silver Screen
	17HP4	17HP4/17HP4	17HP4	17HP4	17HP4/17PB4	12L	
				17RP4			
		17HP4B ③		17HP4B ②		12L	

ELECTROLYTIC CAPACITORS

ITEM No	RATING: CAP	VOLT	TRAV-LER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1A	x40	450	TV-EC-16	FP238	TM-D40-450	D-235	
B	x40	450					
C2A	30	450	TV-EC-38	TCD2303	TD-30-450	D-415	
B	50	200			TD-50-350		
C3	10	50	TV-EC-30	TC32	TD-10-50	FM-0510	
C4A	40	450	TV-EC-17	TCD2297	TD-40-450	FM-4540	
B	50	50			TD-50-50	FM-0550	
C5	100	25	TV-EC-37	TC3501	TD-100-25	MTN-2510	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No	RATING: CAP	VOLT	TRAV-LER PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	NOTES
C6	6.8			TCZ-6R8	NP0A-6R8	ZT-5568	
C7	6.8			TCZ-6R8	NP0A-6R8	ZT-5568	
C8	2-10			829-10			
C9	2.2			TCZ-2R2	NP0A-2R2		
C10	800						
C11	5-3			829-3	3U5-01-0R5	CT585A	
C12	800						
C13	800						
C14	60						
C15	.5-3			829-3	3U5-01-0R5	CT585A	
C16	10			TCN-10	N750K-100	NT-541	
C17	20			TCN-30	N750K-300		
C18	2.2			TCZ-2R2	NP0A-2R2		
C19	6.2				N P0A-6R2		
C20	1000			DD-102	801-001	DC-521	
C21	800						
C22	800						
C23	1000		TV-CC-3	DD-102	801-001	DC-521	
C24A	1000		TV-CC-1	DD2-102	813-001	DCD-521	
B	1000						
C25	.25	600	TV-PC-17			PT2025	
C26	100		TV-CC-5	DE-101	GP1K-101	UC-531	
C27	1000	500	TV-CC-3	DE-102	GP5L-102	MC259	
C28A	1000		TV-CC-1	DD2-102	813-001	DCD-521	
B	1000						
C29	47		TV-CC-13	DE-470	GP1K-470	UC-5447	
C30	100		TV-CC-5	DE-101	GP1K-101	UC-531	
C31	5000		TV-CC-3	DD-502	811-005	DC-525	
C32	5000		TV-CC-3	DD-502	811-005	DC-525	
C33	1000		TV-CC-3	DD-102	801-001	DC-521	
C34	47		TV-CC-13	DE-470	GP1K-470	UC-5447	
C35	100		TV-CC-5	DE-101	GP1K-101	UC-531	
C36	100		TV-CC-5	DE-101	GP1K-101	UC-531	
C37	.1	200	TV-PC-3	DF-104		PT401	
C38A	1000		TV-CC-1	DD2-102	813-001	DCD-531	
B	1000						
C39	5000		TV-CC-3	DD-502	811-005	DC-525	
C40	4.7		TV-CC-15	TCZ-4R7	NP0A-4R7	ZT-555	
C41	.25	400	TV-PC-4			PT4025	
C42	.1	600	TV-PC-18	DF-104		PT601	
C43	10		TV-MC-5	DE-100	GP1K-100	UC-541	
C44	1		TV-CC-14	TCZ-1	NP0A-010		
C45	33		TV-CC-6	DE-330	GP1K-330	UC-5433	
C46	5000		TV-CC-3	DD-502	811-005	DC-525	
C47	5000		TV-CC-3	DD-502	811-005	DC-525	
C48	5000		TV-CC-3	DD-502	811-005	DC-525	
C49	1000		TV-MC-18	DE-102	GP5L-102	UC-521	
C50	47		TV-CC-13	DE-470	GP1K-470	UC-5447	
C51	2200	500	TV-MC-11	DE-222	GP5-333-222	UC-5222	
C52	.05	400	TV-PC-5	DF-503		PT405	
C53	.01	600	TV-PC-15	DE-103	GP3-333-103	PT611	
C54	.100	600	TV-MC-3	DE-101	GP1K-101	MC235	
C55	.02	600	TV-PC-14	DF-203		PT602	
C56	.005	600	TV-PC-8	DE-502	GP3-333-502	PT625	
C57	.02	600	TV-PC-14	DF-203		PT602	
C58	250	500	TV-MC-3	DE-231	811-021	MCB240	
C59	.0047	600	TV-PC-6	DE-472	GP3-333-472	PT6247	
C60	.01	600	TV-PC-15	DE-103	GP3-333-103	PT611	

PARTS LIST AND DESCRIPTIONS (cont)

CAPACITORS (cont)

ITEM No	RATING: CAP	VOLT.	TRAV-LER PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	NOTES
C61A	2200					DC-522	
B	4700		*TV-CC-26	*PC-100	*1405-01	DC-525	
C	4700					DC-535	
C62	4700	500	TV-MC-10			MC3465	
C63	.1	600	TV-PC-18	DF-104		PT601	
C64	.25	600	TV-PC-17			PT6025	
C65	2200	500	TV-MC-11	DS-222	GP3-333-222	UC-5222	
C66	.01	600	TV-PC-15	DE-103	GP3-333-103	PT611	
C67	.01	600	TV-PC-15	DE-103	GP3-333-103	PT611	
C68	.01	600	TV-PC-15	DE-103	GP3-333-103	PT611	
C69	680	500	TV-MC-15	DS-681	811-681		
C70	.25	400	TV-PC-4			PT4025	
C71	.47	400	TV-PC-16			PT472	
C72	3900	500	TV-MC-12			MC3463	
C73	390	500	TV-MC-14	DS-391	811-391	MC3243	
C74	470	500	TV-MC-17	DS-471	811-471	MC3245	
C75	470	500	TV-MC-17	DS-471	811-471	MC3245	
C76	.1	600	TV-PC-18	DF-104		PT601	
C77	.05	400	TV-PC-5	DF-503		PT405	
C78	.1	600	TV-PC-18	DF-104		PT601	
C79	47	1500	TV-CC-37	DD30-470	1R5KV-470	DC30447	
C80	250	500	TV-MC-3	DE-251	GP5K-251	MC240	
C81	47	2000	TV-CC-35	DD30-470	5KV-470	DC30447	
C82	.25	800	TV-PC-17			PT6025	

* Items C61A, C61B, C61C, R63A, R63B and R63C are combined in one unit.

CONTROLS

ITEM No	RATING: RESISTANCE	WATTS	TRAV-LER PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1000Ω	1	VC-60	QJ-258*		R1-4	UF13L	Picture (Panel)
B	1Meg					R2-52	UR16A	Volume (Rear) Attach to R1A.
C	Switch					KB-1	UL-26	Attach to R1B
R2A	100KΩ	1	VC-62	QH-128	A47-400K-S	AB-40	TA18L	Brightness
B	Shaft		Not Req.	Not Req.	KSH-3	AK-4	Not Req.	Attach to R2A.
R3A	1.5Meg	1	VC-63	QH-138	A47-1.5Meg-S	AB-743	TA35L	Vertical Hold
B	Shaft		Not Req.	Not Req.	KSH-3	AK-4	Not Req.	Attach to R3A.
R4A	2.5Meg	1	VC-59	QH-239	A47-2.5Meg-S	BX-83	TA355L	Height
B	Shaft		Not Req.	Not Req.	FKS-1/4	Not Req.	Not Req.	Attach to R4A.
R5A	5000	2	VC-29	WK-5000	A43-5000	VK-136	R5000L	Vertical Linearity
B	Shaft		Not Req.	Not Req.	FKS-1/4			Attach to R5A.

*CONCENTRIKIT EQUIVALENT; K-3 KIT. BASE ELEMENTS AND SHAFTS; B11-108, P1-204, (Panel)
B13-137, R3-216, (Rear)
76-1 (Switch)

RESISTORS

ITEM No	RATING: OHMS	WATT	TRAV-LER PART No.	IRC PART No.	NOTES
R6	680KΩ	1	TV-IR-38	BTS-680	
R7	4700Ω	1	TV-IR-46	BTS-4700	
R8	100KΩ	1			
R9	560KΩ				
R10	10KΩ				
R11	10KΩ				
R12	220KΩ	1	TV-IR-91		
R13	1000Ω	1	TV-IR-24		
R14	4700Ω	2	TV-IR-76	BTB-4700	
R15	4700Ω	2	TV-IR-76	BTB-4700	
R16	100Ω	1	TV-IR-36	BTB-100	
R17	100kΩ		TV-IR-43		
R18	100KΩ		TV-IR-43		
R19	8200Ω		TV-IR-60		
R20	100Ω		TV-IR-36	BTS-100	
R21	47Ω		TV-IR-4	BTS-47	
R22	100KΩ		TV-IR-43		
R23	22KΩ		TV-IR-45		
R24	100Ω		TV-IR-36	BTB-100	
R25	47Ω		TV-IR-4	BTS-47	
R26	22KΩ		TV-IR-45		
R27	1000Ω		TV-IR-24	BTS-4000	
R28	220Ω	1	TV-IR-5	BTS-220	
R29	150Ω	2	TV-IR-70	BTB-15K	
R30	680KΩ		TV-IR-38		
R31	47Ω		TV-IR-4	BTS-47	
R32	8200Ω		TV-IR-60		
R33	4700Ω		TV-IR-46		
R34	470KΩ		TV-IR-11		
R35	4700Ω	2	TV-IR-76	BTB-4700	
R36	56Ω 5%	1	TV-IR-1	BTS-56 5%	
R37	4700Ω		TV-IR-46		
R38	2200Ω	1	TV-IR-67	BTS-2200	
R39	470KΩ		TV-IR-11		
R40	100KΩ		TV-IR-43		
R41	680Ω		TV-IR-61		
R42	220KΩ		TV-IR-91		
R43	68KΩ	2	TV-IR-61	BTS-68K	
R44	12KΩ	2	TV-IR-81	BTB-12K	
R45	68Ω	1	TV-IR-59	BTS-68	
R46	470Ω	1	TV-IR-5	BTS-470	
R47	33KΩ		TV-IR-58	BTS-33K	
R48	6800Ω		TV-IR-78	BTS-6800	
R49	6800Ω		TV-IR-78	BTS-6800	
R50	2.2Meg		TV-IR-13	BTS-2.2Meg	

ITEM No	RATING: OHMS	WATT	TRAV-LER PART No.	IRC PART No.	NOTES
R51	470KΩ	1	TV-IR-11	BTS-470K	
R52	470KΩ	1	TV-IR-11	BTS-470K	
R53	330Ω	1	TV-IR-55	BTA-330	
R54	220Ω	1	TV-IR-75	BTA-220	
R55	22KΩ	1	TV-IR-45		
R56	470KΩ	1	TV-IR-11		
R57	2.2Meg	1	TV-IR-13		
R58	47KΩ	1	TV-IR-10		
R59	1Meg	1	TV-IR-13		
R60	560Ω	1	TV-IR-52	BTS-5600	
R61	680KΩ	1	TV-IR-38		
R62	2700Ω	1	TV-IR-79		
R63A	22KΩ	1			
B	8200Ω	1	*TV-CC-38		
C	8200Ω	1			
R64	1.2Meg	1	TV-IR-111		
	5%				
R65	1Meg	1	TV-IR-13		
R66	330Ω	1	TV-IR-55		
R67	220KΩ	1	TV-IR-91		
R68	560Ω	1	TV-IR-49		
R69	560Ω	1	TV-IR-49		
R70	100KΩ	1	TV-IR-43		
R71	33KΩ	1	TV-IR-58	BTS-33K	
R72	6800Ω	1	TV-IR-80		
R73	100KΩ	1	TV-IR-43		
R74	100KΩ	1	TV-IR-43		
R75	33KΩ	1	TV-IR-58		
R76	5600Ω 5%	1	TV-IR-73		
R77	100KΩ	1	TV-IR-43		
R78	8200Ω	1	TV-IR-60		
R79	150KΩ	1	TV-IR-43		
R80	1500Ω	1	TV-IR-39		
R81	470KΩ	1	TV-IR-11		
R82	100Ω	1	TV-IR-36		
R83	33KΩ	2	TV-IR-57		
R84	18KΩ	1	TV-IR-85		
R85	47Ω	1	TV-IR-41		
R86	100Ω	1	TV-IR-34		
R87	10KΩ	1	TV-IR-84	BTS-10K	
R88	10KΩ	1	TV-IR-84		
R89	3.3Ω	1	TV-IR-65	BTB-3.3	
R90	500Ω	20	TV-WR-18	2D-500	
R91	220KΩ	2	TV-IR-91	BTS-220K	

* Items C61A, C61B, C61C, R63A, R63B, R63C are combined in one unit.

TRANSFORMER (POWER)

ITEM No	RATING: PRI	SEC. 1	SEC. 2	TRAV-LER PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ 1.9A	760VCT @ 190ADC	5VAC @ 3A	TV-TR-15						
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC @ .75A	6.3VAC @ 1.2A	6.3VAC @ 0.7A							

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: TRAV-LER PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No
T2	Vert. Osc. Trans.	TV-TR-10	B6702	A-3003	30P12 ①	V405	A-8125	28A03	A-97X
T3	Horiz Output Trans	TV-TR-15	F2615 *	HVO-25 *		X065 *	A-8232 *		D-19 *
T4	Vert Output Trans.	TV-TR-8	Z1804	A-3037	22G7 ①	V313	A-8123	26B52	A-102X
T5A	Yoke-Horiz.(DM#1)	TV-L-52	DF60① ③	MDF-70 ③	306D2 ① ③	Y70F10 ③	DY-2A ① ③	Y-6 ① ③	Y-21 ① ③
B	Vert.(DM#1)								
T6	Width Coil	TV-L-41		MWC-2 ③	209M ③	20UR5A ③	WC-34 ③	WC-17 ③	WC-12 ③

① Drill new mounting hole(s).
② Use original yoke rear cover and centering device.
③ Use original horizontal damping network.
④ Enlarge mounting hole.
⑤ Do not use tap.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement connections
9	2	2		3	2		9
8	Jumper 5 & 7		Jumper 5 & 7	Jumper 5 & 7			5& 7
7	4	4	4	4	4		4
6	8	8		8	8		1
5	5	6	6	6	6		3
4	NC	NC	NC	NC	NC		NC

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE: PRI	SEC	TRAV-LER PART No	Halldorson PART No	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No	NOTES
T7	5.7kΩ	3.2Ω	TV-AT-11	Z1001	A-2930	A-3877	24S51	S-3X	

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V C	IMP	TRAV-LER PART No.	QUAM PART No.	NOTES
SP1	5"	PM	3.2Ω		SPK-36 ①	5A1	① 5" PM used in Models 517-82, 521-76, 531-79, and 521-80
	3"	PM			SPK-28 ②		② 3" PM Tweeter
	10"	PM	3.2Ω		SPK-36 ③	10A31	③ 10" PM used in Models 5310-60 and 5310-61
	10"	PM	3.2Ω		SPK-40 ④		④ 10" and 3" PM used in Models 521-81, 521-R90 and 521-R91

COILS (RF-IF)

ITEM No.	USE	DC RES: PRI.	SEC.	TRAV-LER PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No	NOTES
L1	Ant. Match-ing Trans	0Ω	0Ω					
L2	Ant. Match-ing Trans.	0Ω	0Ω					
L3	Neut. Coil	0Ω						
L4	Ant., RF, Mixer Grid, & Osc. Coils	0Ω						
L5	RF Coil	0Ω						
L6	Conv Plate	.5Ω	.1Ω					
L7	1st. Video IF	.1Ω	.6Ω	TV-L-26	27-1062	TV-118	6250	
L8	Fil. Choke	0Ω		TV-L-33	19-1001		6004	
L9	2nd. Video IF	.4Ω		TV-L-13	19-1031 *	TV-113 *	6171 *	
L10	Fil. Choke	0Ω		TV-L-23	19-1001		6004	
L11	3rd. Video IF	.3Ω		TV-L-43			6348	Includes 20.6MC trap
L12	4th. Video IF	.3Ω		TV-L-53			6348	Includes 20.6MC trap
L13	RF Choke	3Ω		TV-L-30	19-1005		6013	11 Microhenries
L14	Series Peak-ing Coil	4.6Ω		TV-L-14	19-3100	TV-151	6177	100 Microhenries
L15	Series Peak-ing Coil	6.8Ω		TV-L-31	19-3180 ■	TV-154 ■	6180 ■	117 Microhenries, wound on 10KΩ, 1watt resistor
L16	Shunt Peak-ing Coil	15Ω		TV-L-33A			6166	730 Microhenries
L17	4.5MC Trap	1.8Ω		TV-L-35B	20-1005	TV-151	1469	
L18	Sound IF	1.8Ω		TV-L-35A	27-3403	TV-151	1470	
L19	Ratio Det.	7.5Ω	1.5ΩCT	TV-L-17	17-3497	TV-115	6305	Tertiary winding-.8Ω
L20	Horiz. Osc.	120Ω		TV-L-18	19-1976	TV-153	6210	

* Enlarge mounting hole.
■ Parallel with 10KΩ, 1 watt resistor.

FILTER CHOKE

ITEM No	RATINGS: TOTAL DIRECT CURRENT	D C RESISTANCE	INDUCTANCE @ CURRENT 1000 (%)	TRAV-LER PART No	Halldorson PART No	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L21	190ADC	84.5Ω	2.8H	TV-FC-1	C5030 ①	C-2091 ①	C-2325 ①	28C43	C-17X ①

① Drill new mounting hole.

FUSES

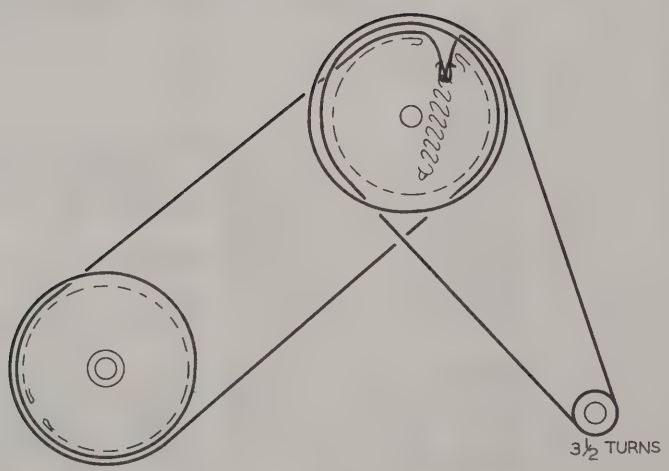
ITEM No	TYPE	RATING	TRAV-LER PART No: FUSE	HOLDER	LITTELFUSE PART No: FUSE	HOLDER	BUSS PART No: FUSE	HOLDER
M1	3AG S/B	3A 125V	TV-F-5S	TV-F-2	313003. (3AG S/B 3A)	34100I	MDL3	HKP
M2	3AG S/B	1/4A 125V	TV-F-1S	TV-F-2	313 250 (3AG S/B 1/4A)	34100I	MDL 1/4	HKP

TRAV-LER MODELS 517-82, 521-79, -80, -81, 521-R90, -91 (CH. 4125A, 4125B, 4126C)

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	TRAV-LER PART No.	NOTES
M3	Dial Light	TV-PB-1	#47
M4	Tuner	TV-TA-18	VHF
M5	Switch	TV-SW-16	Area Selector (SPDT-Rotary)
M6	Centering Device		Part of deflection yoke (T5) rear cover
M7	Ion Trap	TV-MA-7	
B1	Trimmer Cap.	TV-TC-11	Horiz. Drive (15-320MMF)
	Knob	TV-K-166	VHF channel selector
	Knob	TV-K-17	Area Selector
	Knob	TV-K-137	Horiz. Hold
	Knob	TV-K-141	Fine tuning
	Knob	TV-K-165	Picture
	Knob	TV-K-167	On-off-volume
	Knob	TV-K-168	Brightness & vert. hold
	Safety Glass	TV-DW-56	Models 521-74, 521-79, 521-80, 521-81, 5210-60, 5210-61, 521-R90, 521-R91
	Safety Glass	TV-DW-59	Model 517-82
	Safety Glass	TV-DW-60	Models 524-84, 524-85, 524-86
	Mask	TV-MP-58	Models 521-74, 521-79, 521-80, 521-81, 521-R90, 521-R91
	Mask	TV-MP-61	Models 5210-60, 5210-61
	Mask	TV-MP-62	Model 517-82
	Mask	TV-MP-65	Models 524-84, 524-85, 524-86



TUNING GANG FULLY CLOSED

RADIO DRIVE CORD STRINGING

PROPERTY OF
C. F. CLANAHAN
3924 MEADE ST
DENVER, COLORADO

TROUBLE SHOOTING AIDS (cont)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V16, V17, V18 and V19. Check fuse, M2. Check waveform W14.

If Satisfactory	If Unsatisfactory
Check T3, T5A, T6, C76, C78, C79, C80, C82, R83, R84, R89 and other associated components.	Check L20, C72, C73, C74, C75, R76, R80, R78, R79 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V17, V18 and V20. Check adjustments B1 and B2. Check T3, T5A, C75, R83, R84, R89 and other associated components.

BLOOMING

Check by substitution V17, V18, V19 and V20. Check T3, T5A, C75, R83, R84 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or no Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5, V6, V7 and V11. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

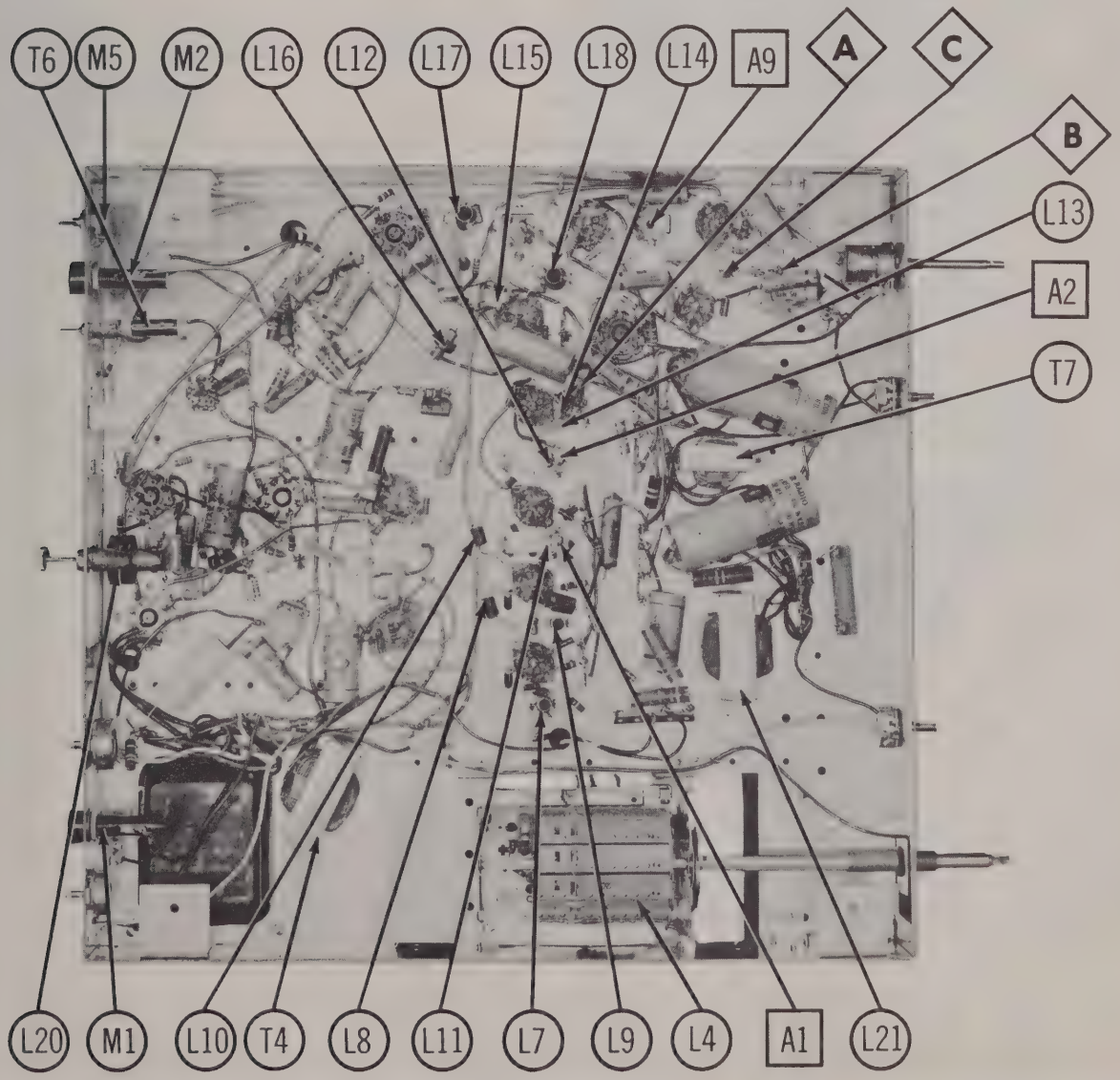
KEYSTONE EFFECT

Check T5 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet above and slightly to the left of the channel selector shaft.

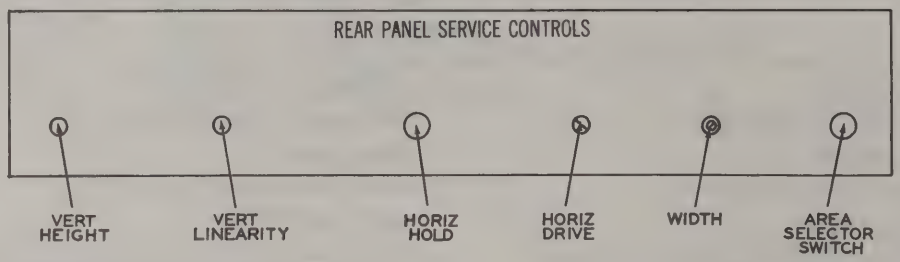
PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Adjust the horizontal hold slug until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz. Adjust the ratio detector secondary slug (A9) located on top of chassis. (See tube placement chart).

FUSES

Two fuses are used. One for horizontal sweep circuit protection and one for LV power supply protection. (For location see tube placement chart).

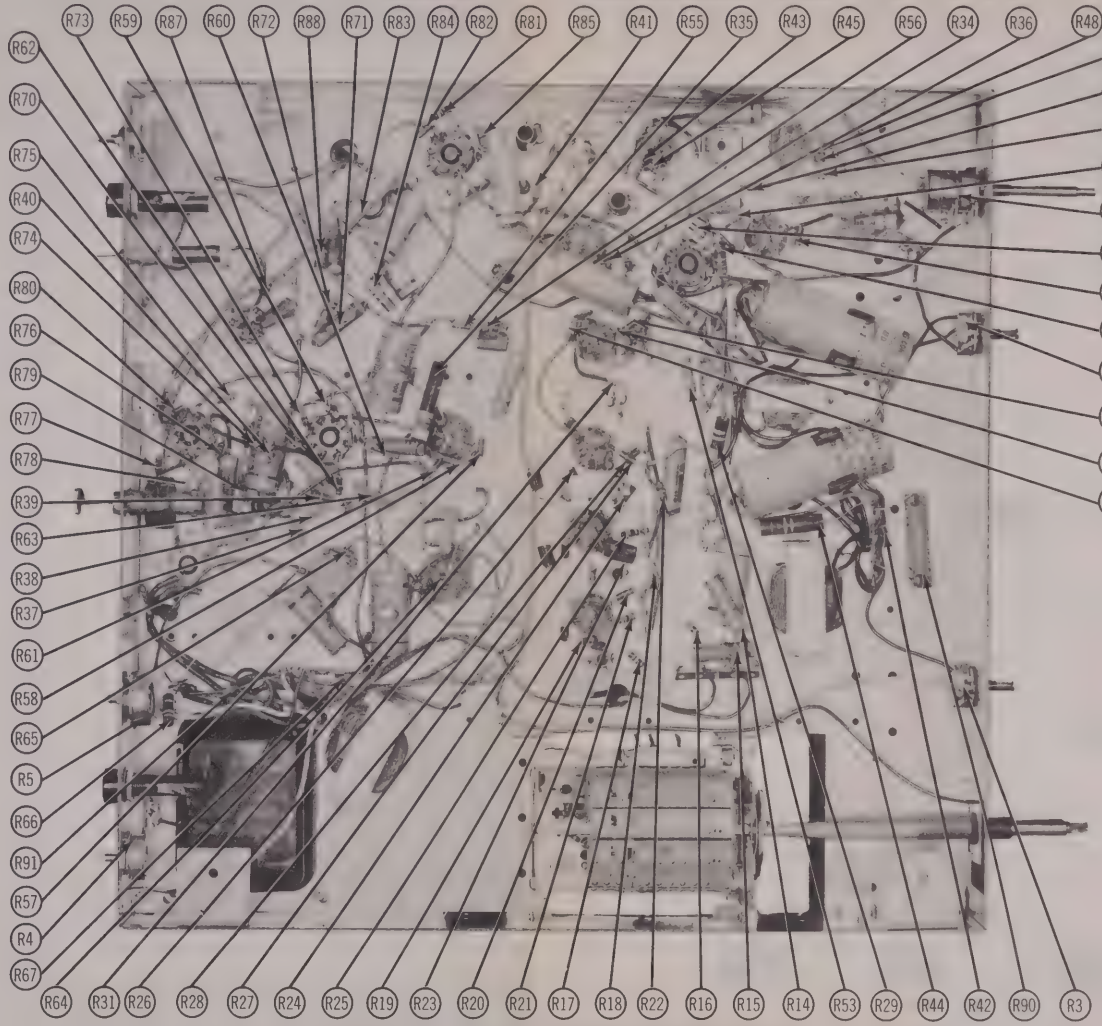
CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 6 push-on type control knobs from front panel of cabinet.
2. Remove 3 metal screws and 2 wood screws. Remove rear cover.
3. Remove 2 wood screws. Remove antenna terminal bracket.
4. Disconnect speaker leads.
5. Remove 4 chassis bolts. Remove chassis.
6. Remove 4 speaker nuts. Remove speaker.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
L. F. [illegible]
[illegible] MINE ST.
[illegible], COLORADO

TRUETONE MODELS
D2586A, B, D2587A, B

TRUETONE MODELS
D2586A, B, D2587A, B

TRADE NAME	Truetone Models D2586A, B, D2587A, B
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Six)	Types: 12BA6 RF Amp., 12BE6 Conv., 12BA6 IF Amp., 12AT6 Det.-AVC-AF Amp., 35C5 Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-DC — RATING .24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1650KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to RF lug on tuning gang. Low side to B-.	456KC (400~ Mod.)	Point of non-interference	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1650KC	Tuning gang fully open	"	A5	"
3.	"	"	540KC	Tuning gang fully closed	"		Range check
4.		Loop (Radiated)	1500KC	Tune to 1500KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
5.		"	600KC	Tune to 600KC signal	"	A7	"

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TRUETONE
Model D2586A

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		TRUETONE PART No.	STANDARD REPLACEMENT		
V1	RF Amp.	12BA6	12BA6	7BK	
V2	Converter	12BE6	12BE6	7CH	
V3	IF Amp.	12BA6	12BA6	7BK	
V4	Det. -AVC-AF Amp.	12AT6	12AT6	7BT	
V5	Audio Output	35C5	35C5	7CV	
V6	Rect.	35W4	35W4	5BQ	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	TRUETONE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	70	150		TCD498	TDL-8030-150	FMT-1540	Note 1
B	30	150					Note 1

Note 1. Some versions may use a 40-40MFD at 150 volt unit (part No. 150-119) in this application.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	TRUETONE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C2	300		156-101	D6-301	GP2K-301	UC-533	Note 2
C3	.05	200	152-104	DF-503		PT415	
C4	.05	200	152-104	DF-503		PT415	
C5	300		156-101	D6-301	GP2K-301	UC-533	Note 2
C6	2000		152-107	D6-202	GP2-333-202	UC-522	
C7A	5000						
B	250		♦166-109	♦PC-71	♦1406-02		
C							
C8	10000		158-102	DD-103	811-01	DC511	
C9	.05	400	152-109	DF-503		PT415	
C10	.1	400	152-108	DF-104		PT401	
C11	.01	400	152-013	D6-103	GP3-333-103	PT411	Note 3

Note 2. Some versions may use a 270MFD unit (part No. 156-101) in this application.
Note 3. Used only in models D2586B, and D2587B.
♦ Items C7A, C7B, C7C, R8A and R8B are combined in one unit. When replacing items separately, items C7B and C7C should total 250MFD.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	120-120	Q18-133X	A47F4-500K	ABT-63	UT429	Volume (Tap at 50KΩ)
B	Shaft		Not Req.	Not Req.	FS-3	AK-3	Not Req.	Attach to R1A.
C	Switch		Not Req.	76-1	SWE-12	KB-1	US-26	Attach to R1A.

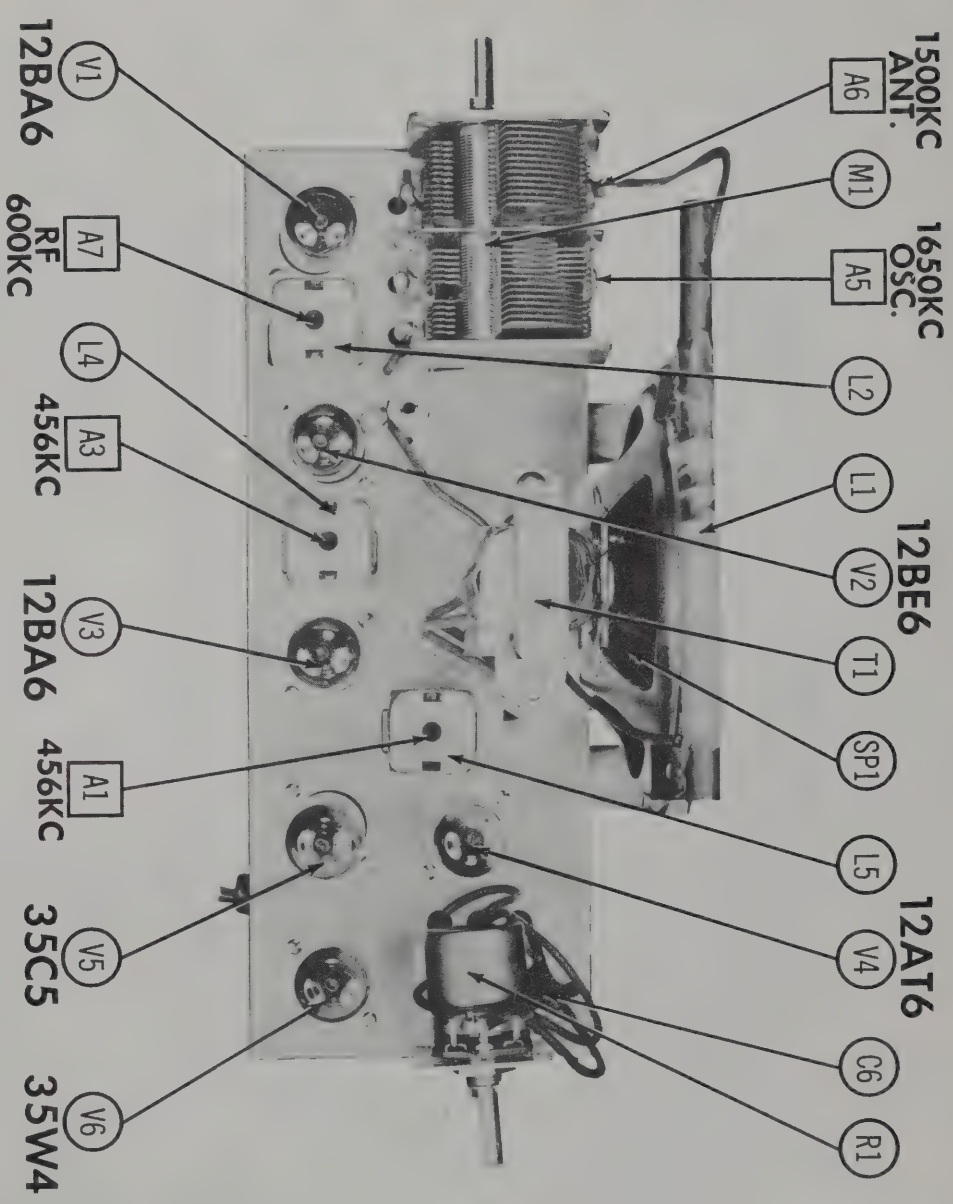
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	TRUETONE PART No.	IRC PART No.	
R2	2.2Meg	½	180-107	BTS-2.2Meg	
R3	47Ω	½	180-103	BTS-47	
R4	22KΩ	½		BTS-22K	
R5	390Ω	½	180-156	BTS-390	Note 1
R6	2.2Meg	½	180-107	BTS-2.2Meg	
R7	10Meg	½	180-123	BTS-10Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	TRUETONE PART No.	IRC PART No.	
R8A	250KΩ	½	♦166-109	BTS-270K	
B	500KΩ	½		BTS-470K	
R9	150Ω	½	180-111	BTS-150	
R10	1500Ω	1	180-157	BTA-1500	
R11	1800Ω	½	180-159	BTS-1800	Note 2
R12	10KΩ	½	180-160	BTS-10K	Note 2

Note 1. Some versions use a 470Ω ½W resistor in this application.
Note 2. Used in models D2586B, D2587B
♦ Items C7A, C7B, C7C, R8A, R8B are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.4KΩ	3.1Ω	Part of spkr.	HZ1003 ①	A-3031 ①	A-3330 ①	24S50A ①	S-16X ①	① Bend one tab and solder to mounting bracket.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	TRUETONE PART No.	QUAM PART No.	
SP1	4"	PM	3.1Ω	175-117	4A07	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	TRUETONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.8Ω		132-113				
L2	RF Coil	115Ω	11Ω*	130-113				
L3	Osc. Coil	.9Ω	7.5Ω	136-117	14-1073■			
L4	Input IF	18Ω	18Ω	130-102	16-6758	BC-352	69-Osc.	
L5	Output IF	10Ω	10Ω	130-107	16-6758	BC-353	12-C1 12-C2	

*Tapped ③ 7.5Ω.
■ Leads sufficient mounting support.

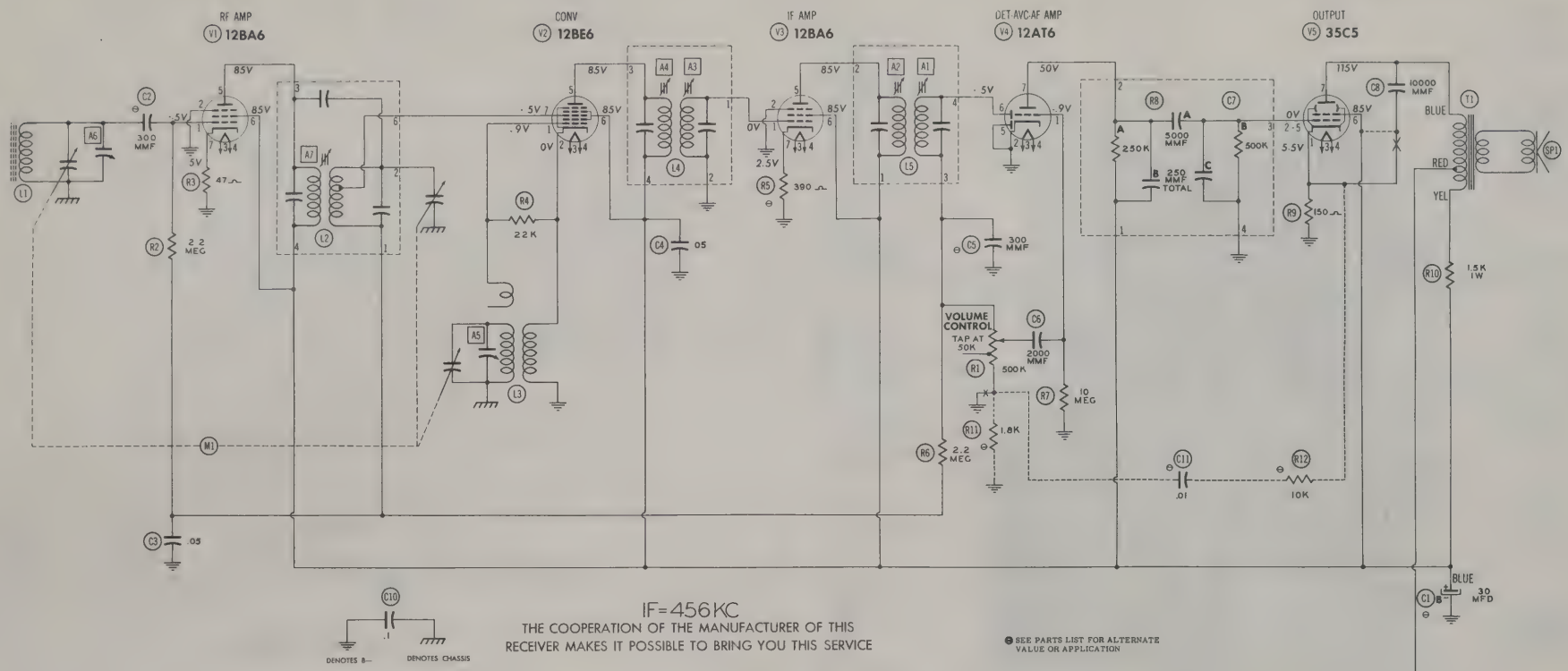
MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M1	Tuning Cap.	160-111	3 Gang (35-480MMF, 9-205MMF, 18-130MMF)
	Cabinet	210-115	Specify color
	Knob	220-116	Tuning
	Knob	220-117	On-off-volume

CHASSIS—BOTTOM VIEW

TRUETONE
Model D2586A

PROPERTY OF
E. F. [illegible] MFG. CO.
3924 MILWAUKEE ST.
DENVER, COLORADO



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BA6	4.9Meg	0Ω	36Ω	24Ω	†1.5KΩ	†1.5KΩ	47Ω
V 2	12BE6	22KΩ	.5Ω	24Ω	12Ω	†1.5KΩ	†1.5KΩ	2.7Meg
V 3	12BA6	15Ω	0Ω	36Ω	48Ω	†1.5KΩ	†1.5KΩ	390Ω
V 4	12AT6	10Meg	0Ω	0Ω	12Ω	0Ω	500KΩ	†250KΩ
V 5	35C5	150Ω	500KΩ	48Ω	83Ω	500KΩ	†15.KΩ	†260Ω
V 6	35W4	TP	NC	83Ω	118Ω	118Ω	110Ω	100KΩ

†MEASURED FROM PIN 7 OF V6.
TP-TIE POINT.
NC-NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

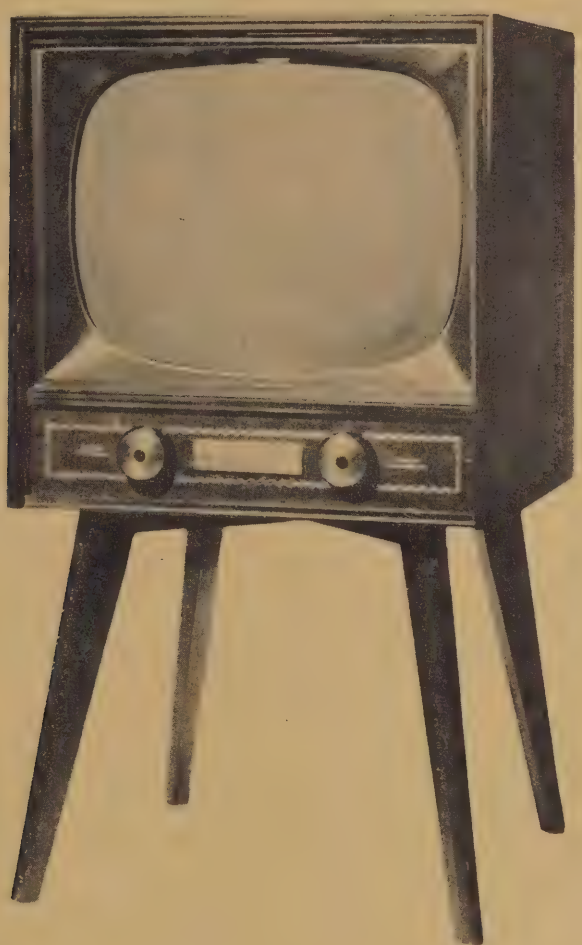
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1955

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

PROPERTY OF
L. F. GLASSCOCK SHIP
3221 MEADE ST
DENVER, COLORADO

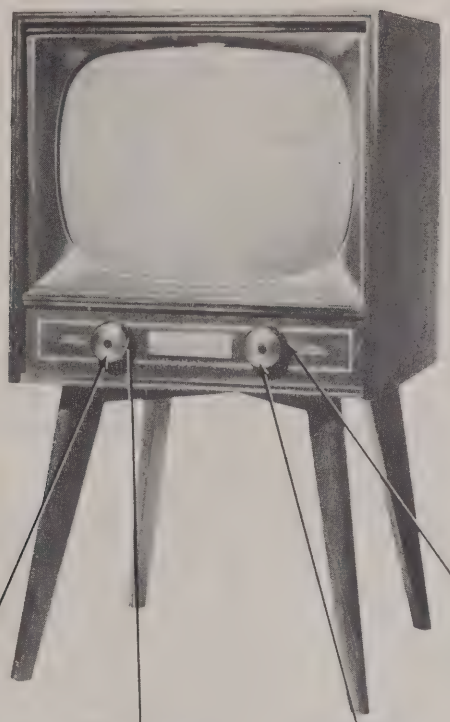


MODEL 2D2534A

TRUETONE MODELS
2D1534A, 2D1536A, 2D2534A

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America



PROPERTY OF
L. F. BLANKENSHIP
DENVER, COLORADO

TRUETONE MODELS
2D1534A, 2D1536A, 2D2534A

TRUETONE MODEL 2D2534A

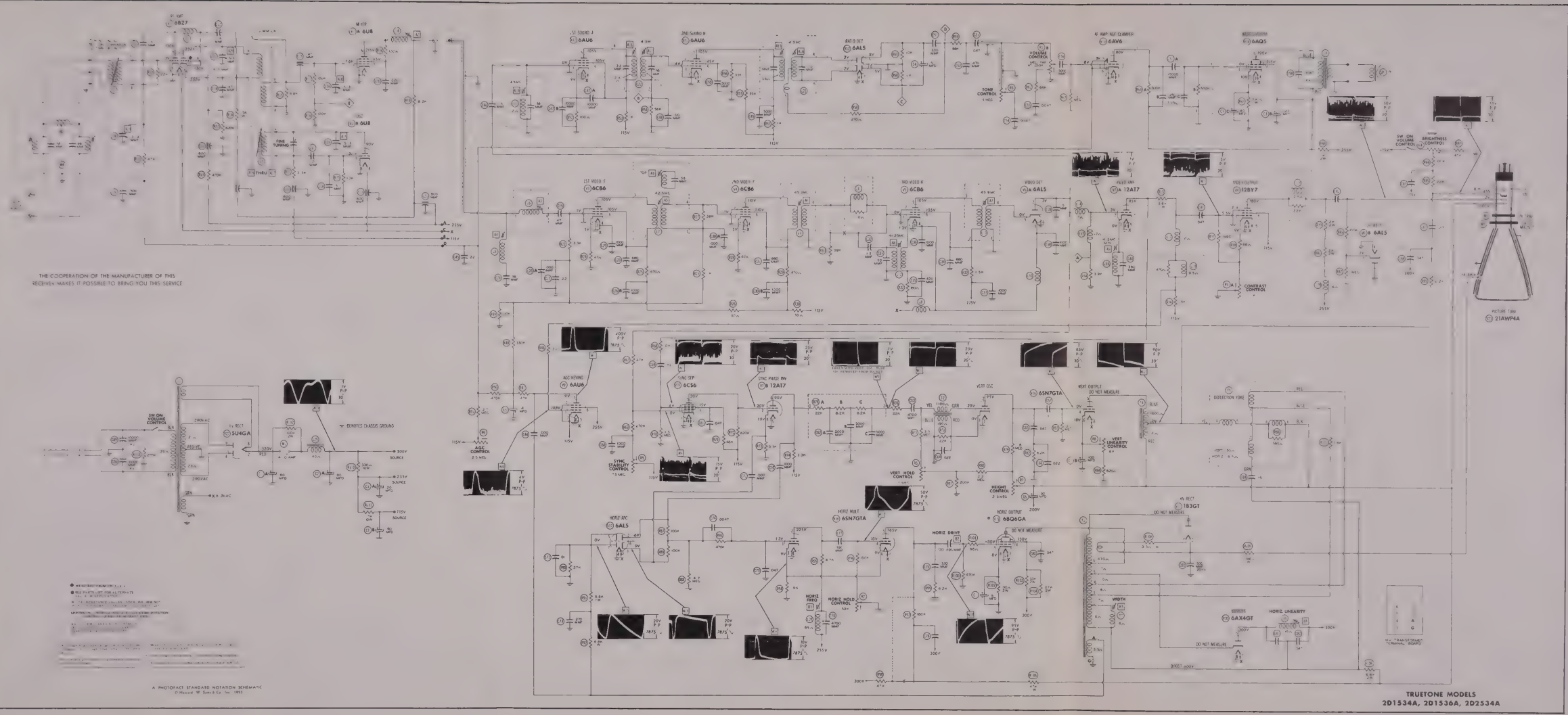
TRADE NAME	Truetone Models 2D1534A, 2D1536A, 2D2534A
SUPPLIER	Western Auto Supply Co., 2107 Grand Avenue, Kansas City, Mo.
TYPE SET	Television Receiver
TUBES	Twenty-three
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 1.64 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

INDEX

Alignment Instructions 6, 7
Disassembly Instructions 18
Horizontal Sweep Circuit Adjustments 11
Parts List and Descriptions ..... 13 thru 16
Photographs
Cabinet-Rear View 11
Capacitor Identification 4, 9
Chassis-Top View 3
RF Tuner 10
Resistor Identification 19, 20
Photographs (Cont)
Trans., Inductor & Alignment Identification 17
Resistance Measurements 8
Servicing in the Field 18
Schematic (Alternate Tuners) 10, 16
Schematic (TV) 2
Trouble Shooting Aids 12, 17
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

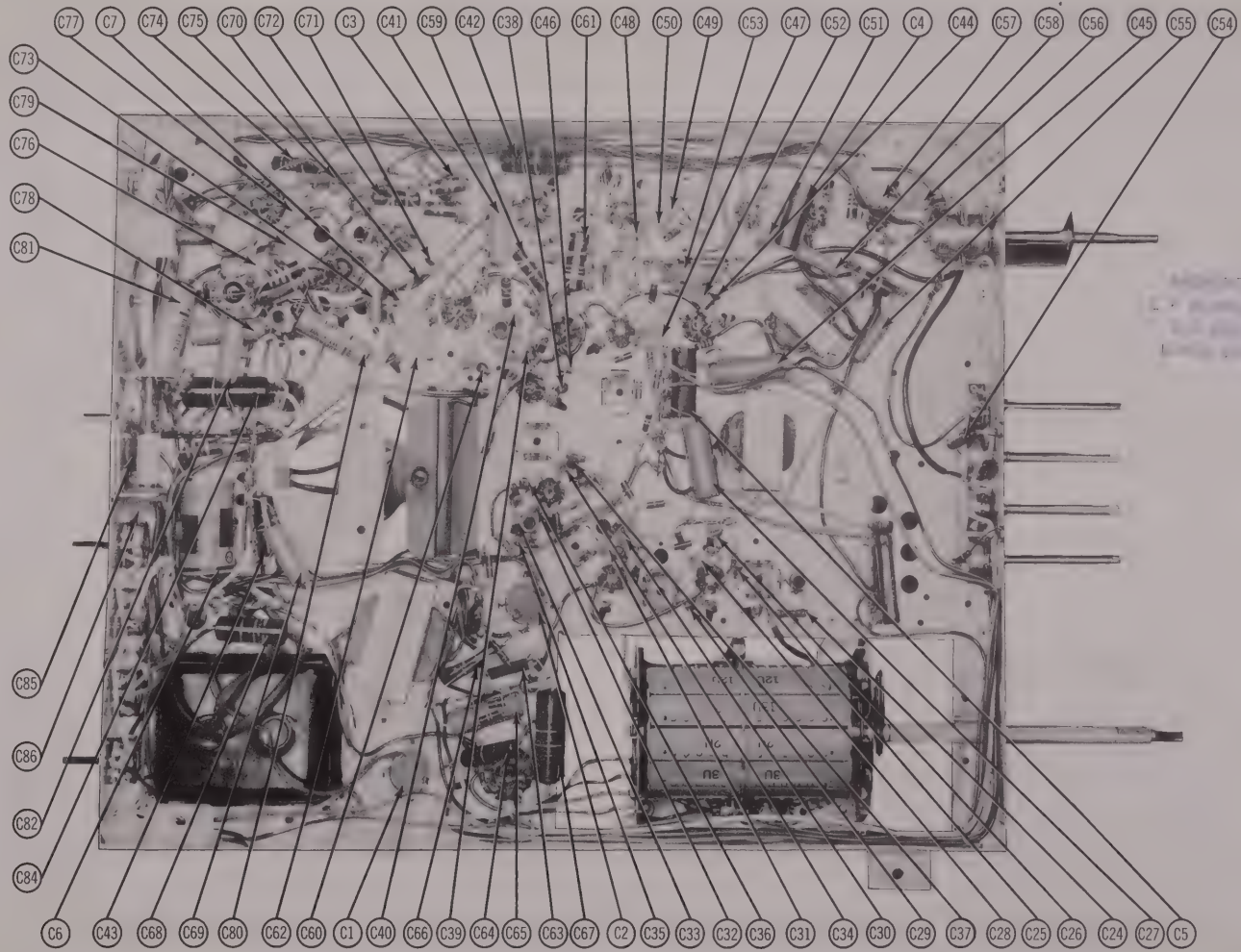
HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America


THE COOPERATION OF THE MANUFACTURER OF THIS
RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
TRUETONE MODELS
2D1534A, 2D1536A, 2D2534A

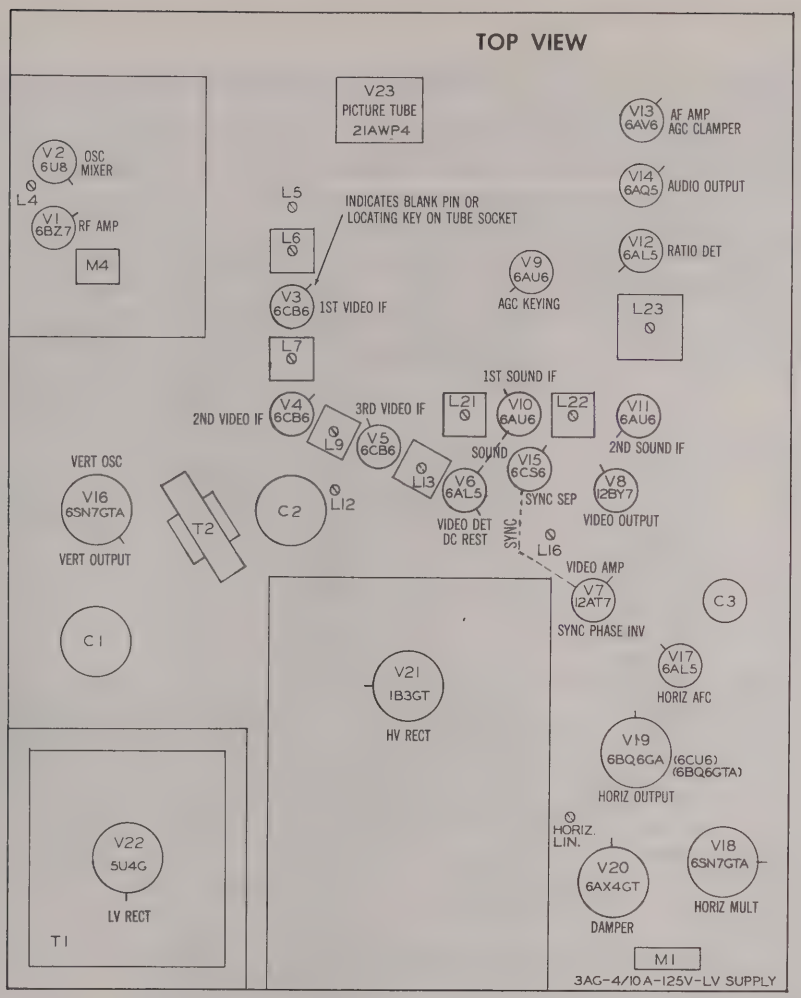
PROPERTY OF
L F B PARTNERSHIP
DENVER, COLORADO

CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART



PROPERTY OF
L. F. ENTERKENSHIP
4021 MERCE ST.
DENVER, COLORADO

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V22, Fuse (M1)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V8, V9, V23**
Has pic, no sound - **V10, V11, V12, V13, V14**
Overloaded picture - **V9, V13**

SYNC FAILURE
No vert. sync - **V7, V16**
No horiz. sync - **V7, V17, V18**
No vert. or horiz. sync - **7, V15**

SWEEP FAILURE
No raster, has sound - **V18, V19, V20, V21, V23**
No vertical deflection - **V16**
Poor vert. linearity or foldover - **V16**
Poor horiz. linearity or foldover - **V18, V19, V20**
Narrow picture - **V18, V19, V20, V21, V22**
Vert. off freq. - **V7, V16**
Horiz. off freq. - **V7, V17, V18**

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from chassis.

VIDEO IF ALIGNMENT

Connect the negative lead of a 1.5V battery to the ungrounded side of C27. Connect the positive lead to chassis.
Remove the converter tube (V2) from its socket and replace with a 6U8 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
An alternate method of disabling the local oscillator is to place a piece of transparent tape on the first two contacts from front of drum assembly) of any channel and then switch to the insulated strip.
Use only enough generator output to produce usable indication on scope or VTVM.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	44MC (10MC Swp)	41.25MC 45.75MC 47.25MC	Any	Vert. Amp. thru detector (Fig.1) to pin 5 of 6CB6 (V3). Low side to chassis.	A1, A3, A3, A4	Adjust A1 to place 47.25MC marker in trap notch as in Fig. 2. Adjust A2, A3 and A4 for response similar to Fig. 2. A3 and A5 affect the flat portion of curve. A4 positions the 41.25MC marker. Make sure 45.75MC marker is on peak of curve as shown or 44.5MC marker on overall response will be incorrect.
2.	"	"	Not used	43.5MC (Unmod)	"	Used VTVM. DC probe to point (A). Common to chassis	A5	Increase bias from 1.5 volts to 4.5 volts at ungrounded side of C27. Attenuate generator output to maintain 1 volt at VTVM. Adjust for maximum deflection.
3.	"	"	"	45.3MC (Unmod)	"	"	A6	"
4.	"	"	"	43.9MC (Unmod)	"	"	A7	"
5.	"	"	"	41.25MC (Unmod)	"	"	A8	"
6.	"	"	44MC (10MC Swp)	41.25MC 43.25MC 42.5MC 43.9MC 44.5MC 45.3MC 45.75MC 47.25MC	"	Vert. Amp. thru 10KΩ to point A . Low side to chassis.		Check for response curve similar to Fig.3. SLIGHTLY retouch A5 thru A8 to obtain desired response. If A1 thru A4 requires retouching , step 1 should be repeated.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	10KΩ	High side thru 10KΩ to pin 2 (plate) of 6AL5 (V6A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to pin 3 (grid) of picture tube. Common to chassis.	A9	Adjust for MINIMUM deflection.

ALTERNATE 4.5MC TRAP ALIGNMENT

Remove the dummy converter tube and replace the original 6U8 in its socket or remove cellulose tape from tuner strip.
Remove bias supply.
Tune to a TV station and adjust A9 for minimum 4.5MC beat interference in picture.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Remove 6CB6 (V5) from its socket.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	10KΩ	High side thru 10KΩ to pin 2 (plate) of 6AL5 (V6A) . Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B) . Common to chassis.	A10, A11, A12	Adjust for maximum deflection.
9.	"	"	"	"	DC probe to point (C) . Common to chassis.	A13	Use only enough signal generator output to provide usable indication on VTVM. Adjust for maximum deflection.
10.	"	"	"	"	DC probe to point (D) . Common to chassis.	A14	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Replace V5 in its socket.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Remove 6CB6 (V5) from its socket.
Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	10KΩ	High side thru 10KΩ to pin 2 (Plate) of 6AL5 (V6A) . Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (B) . Low side to chassis.	A10, A11, A12,	Adjust for curve of maximum amplitude and symmetry similar to Fig. 4.
9.	"	"	"	"	"	Vert. Amp. to point (C) . Low side to chassis.	A13	Disconnect stabilising capacitor C4. Use only enough sweep generator output to provide usable indication on scope. Adjust for curve of maximum amplitude and symmetry similar to Fig. 4.
10.	"	"	"	"	"	Vert. Amp. to point (D) . Low side to chassis.	A14	Reconnect stabilising capacitor C4. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 5. SLIGHTLY retouch A13 for maximum amplitude and straightness of crossover lines.

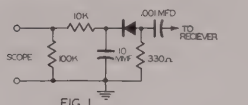


FIG. 1

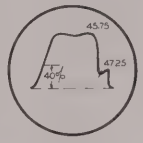


FIG. 2

FIG. 3

FIG. 4

FIG. 5

FIG. 6

FIG. 7

VHF OSCILLATOR ALIGNMENT

Connect the negative lead of a 4.5 volt battery to the ungrounded side of C27.
Connect positive lead to chassis.
Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency the same amount for a majority of the channels it may be possible to correct them in one step using A15 adjustment. It should be noted that this is an all channel oscillator circuit adjustment, and should not be used to correct any individual channel. If adjustment of A15 will not bring all channels well within range of the fine tuning control it will be necessary to adjust the channel strip adjustment screw for each channel that is off frequency.
The channel oscillator adjustment screws are reached thru a hole just to the left of the channel switch shaft.
The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Remove the dummy converter tube and replace original 6U8 in its socket or remove cellulose tape from tuner strip.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A) . Low side to chassis.	A16	Adjust to place sound marker in trap notch as in Fig. 6. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A17	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A18	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A19	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A20	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A21	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A22	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A23	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A24	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A25	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A26	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A27	

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the ungrounded side of C45. Connect positive lead to chassis ground.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point (D) . Low side to chassis.	A28, A29, A30	Adjust for response curve similar to Fig.7 with markers above 90%.
13.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		If markers fall below 70% on any channel make compromise adjustment of A28, A29 and A30 with channel switch set to that channel. Then recheck all other channels to see that they have not been seriously affected.
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

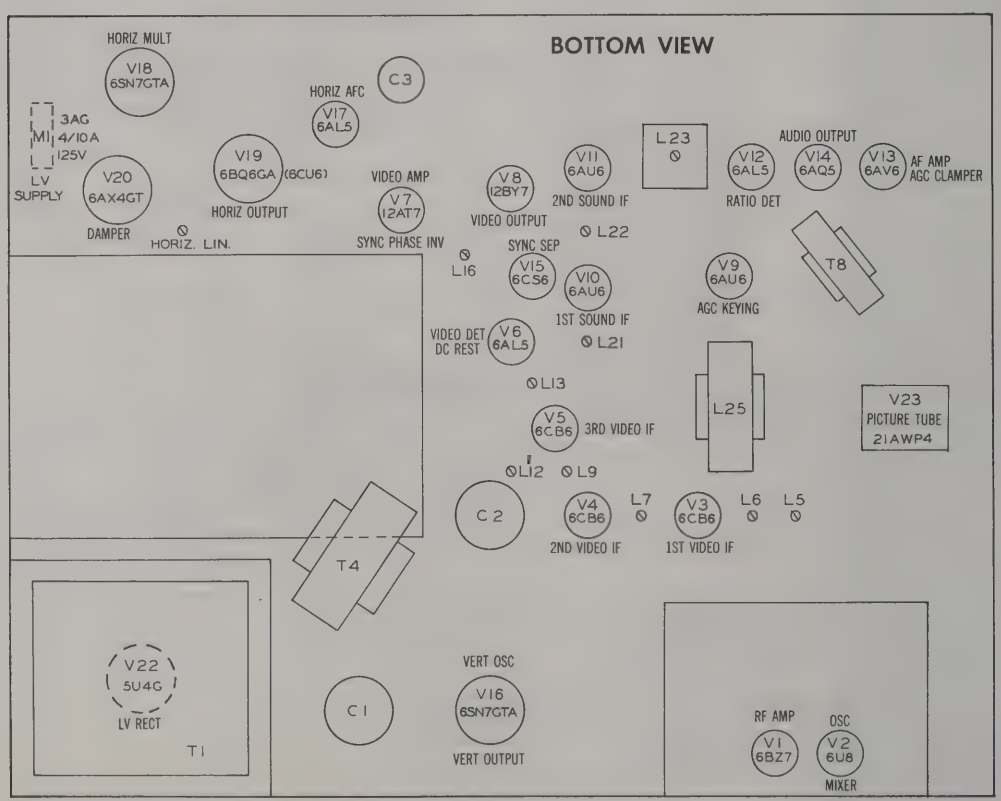
UHF TUNER ALIGNMENT

This portion of the set has been properly aligned at the factory.
Alignment of this portion is not recommended in the field.

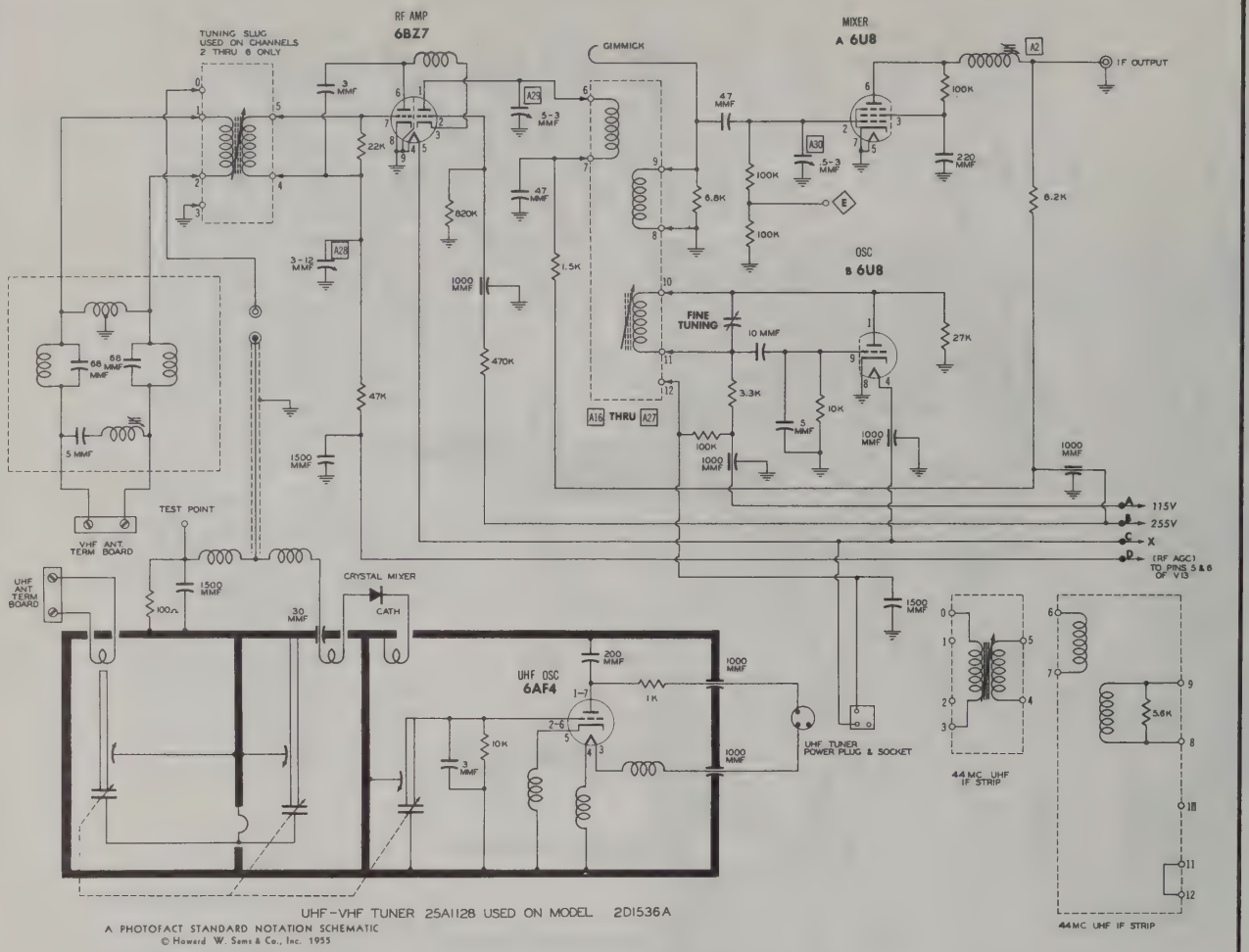
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	†1.8KΩ	300KΩ	INF	0Ω	.1Ω	INF	1Meg	0Ω	†1.8KΩ
V 2	6U8	†5.3KΩ	200KΩ	†100KΩ	.1Ω	0Ω	†8.2KΩ	0Ω	0Ω	10KΩ
V 3	6CB6	100KΩ	47Ω	0Ω	.1Ω	†2.8KΩ	†2.8KΩ	0Ω		
V 4	6CB6	100KΩ	47Ω	0Ω	.1Ω	†2.7KΩ	†2.7KΩ	0Ω		
V 5	6CB6	.1Ω	180Ω	0Ω	.1Ω	†3.5KΩ	†3.5KΩ	0Ω		
V 6	6AL5	1Meg	3.9KΩ	.1Ω	0Ω	.4Ω	0Ω	0Ω		
V 7	12AT7	†9KΩ	3.9KΩ	.2Ω	0Ω	0Ω	†5.3KΩ	†820KΩ	3.3KΩ	.1Ω
V 8	12BY7	450Ω	1Meg	0Ω	.1Ω	.1Ω	0Ω	†4KΩ	†2.1KΩ	0Ω
V 9	6AU6	†36KΩ	†2.1KΩ	.1Ω	0Ω	500KΩ	†400Ω	†2.1KΩ		
V 10	6AU6	2Ω	0Ω	0Ω	.1Ω	†3KΩ	†3KΩ	100Ω		
V 11	6AU6	56KΩ	0Ω	.1Ω	0Ω	†3KΩ	†30KΩ	0Ω		
V 12	6AL5	INF	INF	.1Ω	0Ω	10KΩ	0Ω	10KΩ		
V 13	6AV6	10Meg	0Ω	.1Ω	0Ω	850KΩ	850KΩ	†500KΩ		
V 14	6AQ5	500KΩ	330Ω	0Ω	.1Ω	†2KΩ	†1.4KΩ	500KΩ		
V 15	6CS6	50KΩ	0Ω	.1Ω	0Ω	†820KΩ	†68KΩ	1.5Meg		
V 16	6SN7GTA	4Meg	▲2.5Meg	190Ω	2.2Meg	▲8.5KΩ	2KΩ	0Ω	.1Ω	
V 17	6AL5	4.8Meg	4.8Meg	.1Ω	0Ω	10KΩ	NC	10KΩ		
V 18	6SN7GTA	5Meg	†5KΩ	1.5KΩ	160KΩ	†230KΩ	1.5KΩ	.1Ω	0Ω	
V 19	6BQ6GA	TP	0Ω	TP	†15KΩ	470KΩ	TP	.1Ω	100Ω	Top Cap ▲17Ω
V 20	6AX4GT	TP	NC	150KΩ	TP	†65Ω	NC	.1Ω	0Ω	
V 21	1B3GT		PINS	1 - 8	HAVE	INFINITE	RESISTANCE			Top Cap ▲450Ω
V 22	5U4GA	INF	50KΩ	INF	23Ω	INF	21Ω	INF	50KΩ	
V 23	21AWP4	0Ω	1Meg	Pin 10 ▲6.8KΩ	Pin 11 †250KΩ	Pin 12 .1Ω				

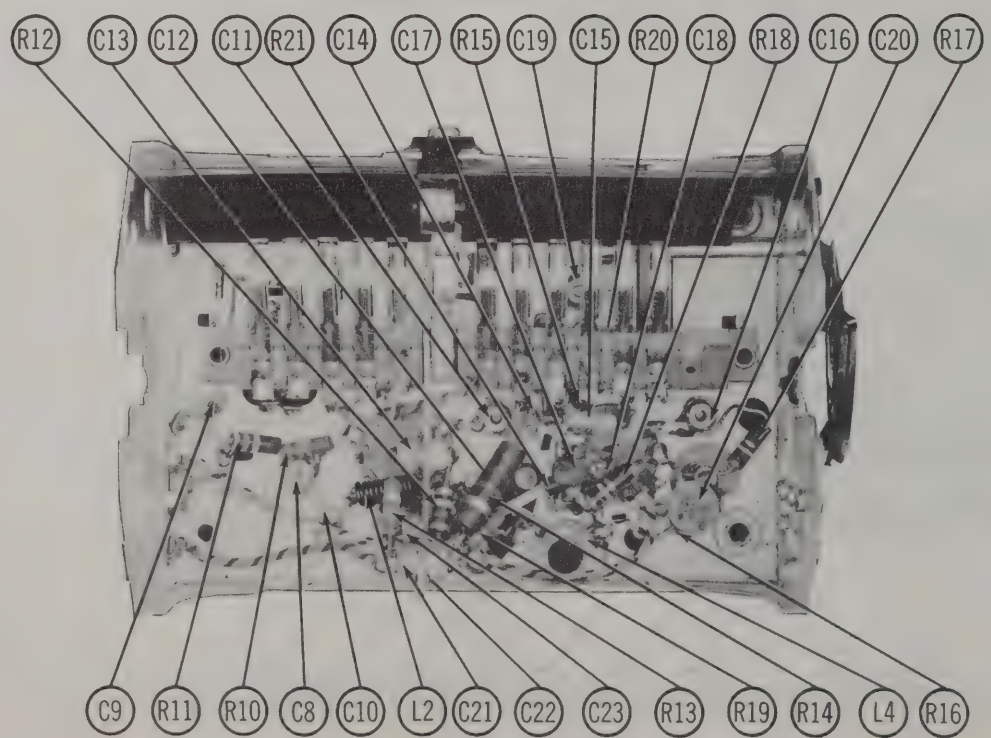
† MEASURED FROM PIN 2 OF V22.
▲ MEASURED FROM PIN 3 OF V20.
TP - TIE POINT
NC - NO CONNECTION



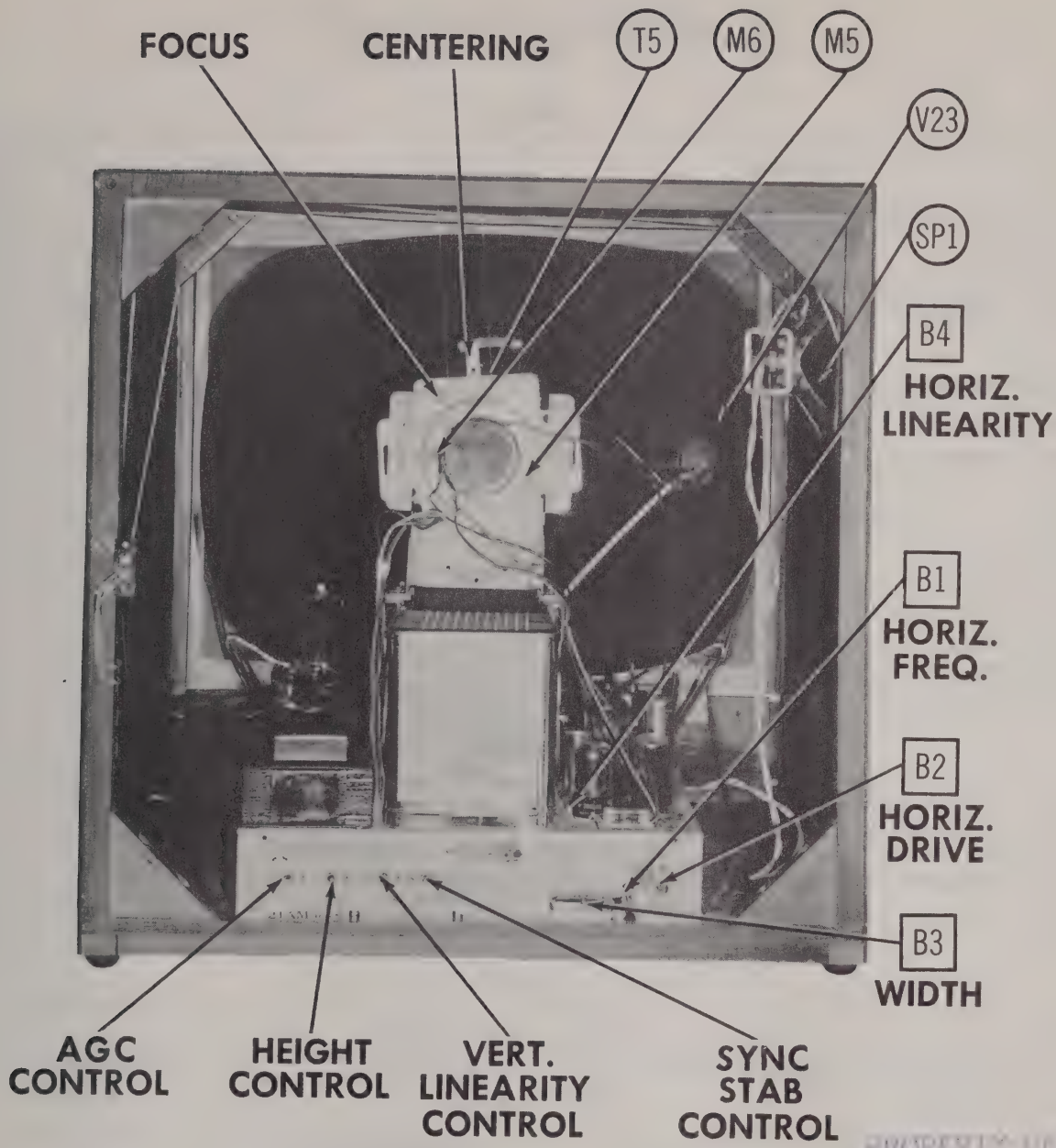
TUBE PLACEMENT CHART



ALTERNATE TUNER SCHEMATIC



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

PROPERTY OF
L. F. [illegible]
DENVER, COLORADO

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station preferably a test pattern.

IF horizontal hold control fails to maintain sync, set it in the middle of its range and adjust the horizontal frequency slug (B1) until the picture is in sync. Check other channels and if necessary readjust B1 slightly for best sync on all channels. With picture locked in sync turn contrast control to minimum contrast and adjust brightness control for a washed out picture. Adjust the width control (B3) for a picture slightly wider than necessary to fill the mask horizontally.

Turn the horizontal drive timmer (B2) inward (if necessary) until horizontal drive line disappears.

Adjust the horizontal linearity control (B4) for a picture that is synmetrical from left to right.

Adjust the picture centering device located in front of focus magnet to center picture in the mask.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss Of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V19, V20 and V22. Check adjustments B2, B3 and B4. Check T3, T5A, R103, R104, R99, C79, C7 and other associated components.

DRIVE LINES

Check by substitution V19 and V20. Check adjustments B2 and B4. Check R103, R104 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V19 and V20. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V18, V19 and V20. Check C75 for open. Check L24, C76, R94 and other associated components.

XMAS TREE EFFECT

Check by substitution V18, V19 and V20. Check T3 and T5 for internal arcing. Check C72, C74, C76, C77, L24, R90, R95 and other associated components.

VERTICAL

LOSS OF SWEEP

Substitute V16. Check waveform W11.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R8, R84 and other associated components.	Check T2, R77, R79, R106, R7, C64, C67 and other associated components.

INSUFFICIENT SWEEP

Substitute V16. Check height and vertical linearity controls for proper operation. Check R79, T4 and other associated components.

COMPRESSED AT BOTTOM

Substitute V16. Check R79, R80, R106, R7, C67 and other associated components.

COMPRESSED AT TOP

Substitute V16. Check R8, R84, C2B, C67, T4 and other associated components.

FOLDS

Substitute V16. Check C65, C66, C67, R82, T4, T5B and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V15 and V7. Check C59, C61, R71, R72, R74 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V16. Check vertical integrator network. Check C63, C64, R78, R77, R5, T2 and other associated components.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V17 and V18. Check C70, C71, C76, L24, R95 and other associated components.

HORIZONTAL BENDING

Check by substitution V7, V15, V17 and V18. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Check by substitution V7 and V8. Check R35, R36, R39, R40, C41, C42, L20, L17 and other associated components.

SOUND BARS(4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A9. Check Video IF Alignment.

POOR CONTRAST

Check by substitution V7 and V8. Check contrast control. Check L18, L19, C41, C42 and other associated components.

NEGATIVE PICTURE

Check by substitution V7 and V8. Check picture tube. Check C41, C42, R38 and other associated components.

SMEAR

Check by substitution V7 and V8. Check L14, L15, L18, L19, C41, C42 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5, V6, V7 and V8 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V10, V11, V12, V13 and V14. Check stages V13 and V14 using audio signal generator. Apply audio signal across R1B.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value.	Check C53, C56, C57, C58, C3B, C3C, R66, R65, R64, T8, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A14 for minimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak Or No Sound".

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, substitute V22. Check M1 fuse. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Substitute V22. Check B+ filter and decoupling network.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		TRUETONE PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6BZ7	6BZ7	9AJ	
V2	Mixer-Osc.	6U8	6U8	9AE	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Det.- DC Restorer	6AL5	6AL5	6BT	
V7	Video Amp.- Sync Phase Inv.	12AT7	12AT7	9A	
V8	Video Output	12BY7	12BY7	9BF	
V9	AGC Keying	6AU6	6AU6	7BK	
V10	1st. Sound IF Amp.	6AU6	6AU6	7BK	
V11	2nd. Sound IF Amp.	6AU6	6AU6	7BK	
V12	Ratio Det.	6AL5	6AL5	6BT	
V13	AF Amplifier- AGC Clamper	6AV6	6AV6	7BT	
V14	Audio Output	6AQ5	6AQ5	7BZ	
V15	Sync Separator	6CS6	6CS6	7CH	
V16	Vert. Oscillator- Vert. Output	6SN7GTA	6SN7GTA	8BD	
V17	Horiz. AFC	6AL5	6AL5	6BT	
V18	Horiz. Mult.	6SN7GTA	6SN7GTA	8BD	
V19	Horiz. Output	6BQ6GA	6BQ6GA	6AM	6CU6, 6BQ6TA used as alternate
V20	Damper	6AX4GT	6AX4GT	4CG	
V21	HV Rectifier	1B3GT	1B3GT	3C	
V22	LV Rectifier	5U4GA	5U4GA	5T	

PROPERTY OF
[illegible] SHOP
[illegible] MEADE ST.
DENVER, COLORADO

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA					RETMA BASE TYPE	NOTES
	TRUETONE PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.		
V23	21AWP4 ①	21AWP4 ①	21AWP4 ①	21AWP4 ②	21AWP4 ①	12N	① Aluminized ② Silver Screen

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	TRUETONE PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	▰80	400	45X390	FP229.4	TM-D80-450	T-180	
B	▲60	400					
C2A	▰80	400	45X391	FP229.8	TM-3057	T-720	
B	▲100	50					
C3A	■20	400	45X392	FP234	TM-D20-450	D-215	
B	▲20	400		TC39	TD-50-50	FM-0550	
C	40	50					
C4	5	25		TC30	TD-5-25	MMT-0505	
C5	4	100	45X361	TC40	TD-4-150	FM-1504	
C6	30	400		TC77	TD-30-450	FM-4530	
C7	5	25		TC30	TD-5-25	MMT-0505	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	TRUETONE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C8	3-9		31A-079	829-10			
C9	1500			DD-152	801-0015	DC-5215	
C10	3		13L-8C030K	TCZ-3R3	NP0A-030	ZT-5533	
C11	.5-3		31A-056-1	829-3	3115-01-0R5	CT565A	
C12	1.5		13L-8C1R5C	TCZ-1R5	NP0A-1R5	ZT-5515	
C13	800						
C14	47		13L-8Q470K	DD-470	831-470	UC-5447	
C15	47		13M-20U470K-R	MFT-50			
C16	.5-3		31A-056-1	829-3	3115-01-0R5	CT565A	
C17	10		13L-8T100A	TCN-10	N750K-100	NT-541	
C18	5		13L-8UA050C				
C19	.5-3		31A-056-1	829-3	3115-01-0R5	CT565A	
C20	220		13L-12D221K	DD-221	811-221	UC-5322	
C21	800						
C22	800						
C23	800						
C24	36		47X626				
C25	47			D6-470	GP1K-470	UC-5447	
C26A	1000			DD2-102	812-001	DCD-521	
B	1000						
C27	.22	200	RCP10M2224M			PT4022	
C28	680			DD-681	811-681	UC-5368	
C29	1000			DD-102	801-001	DC-521	
C30A	1000			DD2-102	812-001	DCD-521	
B	1000						
C31	680			DD-681	811-681	UC-5368	
C32	1.5			TCZ-1R5	NP0A-1R5	ZT-5515	
C33	150	500	RCM15E151K	D6-151	811-151	MCB236	
C34	680			DD-681	811-681	UC-5368	
C35	470		80X4	DD-471	831-471	UC-5347	
C36	1000			DD-102	801-001	DC-521	
C37	1000			DD-102	801-001	DC-521	
C38	1000			DD-102	801-001	DC-521	
C39	5		47X562	TCZ-4R7	NP0A-050	ZT-555	
C40	360	500	47X568		811-361		
C41	.047	400		DF-503		PT4147	
C42	.1	400		DF-104		PT401	
C43	.1	200		DF-104		PT401	
C44	1000			DD-102	801-001	DC-521	
C45	.22	200	RCP10M2224M			PT4022	
C46	1.5			TCZ-1R5	NP0A-1R5	ZT-5515	
C47A	10000		80X6	DD3-103	811-01	DC-511	
B	10000				811-01	DC-511	
C48	100			D6-101	GP1K-101	UC-531	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA TRUETONE PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	NOTES
C49	5000			DD-502	811-005	DC-525	
C50	5000			DD-502	811-005	DC-525	
C51	330	500	47X330	DS-531	811-331	DC-5333	
C52	470	500	47X330	DS-471	GPSK-471	MC345	
C53	.047	300		DF-503		PT9147	
C54	.0047	400		DS-472	GP2-333-472	PT9247	
C55	.0047	400		DS-472	GP2-333-472	PT9247	
C56	5000			DD-502	811-005	DC-525	
C57A	10000						
B	250		†76X5	†PC-80	†1406-01		
C							
C58	.0047	500		DS-472	GP2-333-472	PT9247	
C59	.01	400		DS-103	GP2-333-103	PT941	
C60	1000			DD-102	801-001	DC-521	
C61	.047	400		DF-503		PT9147	
C62A	2000					DC-522	
B	5000		*76X7	*PC-100	*1406-01	DC-525	
C	5000					DC-525	
C63	4700	500	47X543			MC8565	
C64	.022	200		DF-203	817-03	PT9123	
C65	.047	600		DF-503		PT9147	
C66	.022	200		DF-203	817-03	PT9123	
C67	.1	600		DF-104		PT9247	
C68	.047	600		DF-503		PT9147	
C69	.015	600	RCP10M8153M	DDH-153		PT9115	
C70	1000			DD-102	801-001	DC-521	
C71	1000			DD-102	801-001	DC-521	
C72	.01	400		DS-103	GP2-333-103	PT941	
C73	270	500		DS-271	811-271	MC341	
C74	.0047	400		DS-472	GP2-333-472	PT9247	
C75	.047	300		DF-503		PT9147	
C76	4700	500	47X543			MC8565	
C77	390	500	RCM30S39J	DS-391	811-391	MC3543	
C78	.1	400		DF-104		PT401	
C79	330	500	47X370	DS-331	811-331		
C80	.047	400		DF-503		PT9147	
C81	.1	400		DF-104		PT9147	
C82	.047	400		DF-503		PT9147	
C83	500	30000	47X500	TV3-502	413	HV20035A	
C84	.15	400	RCP10M4154M			PT4015	
C85	10000	1000		DD-103			
C86	10000	1000		DD-103			

† Items C57A, C57B, C57C, R64A, R64B are combined in one unit.
When replacing items separately C57B and C57C should total 250MMF.
• Items C62A, C62B, C62C, R57A, R57B and R75C are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1000Ω		57EX81	*QJ-838	RTV-202	F1-4	UF13L	Contrast - Panel
B	1Meg					R3-39	UR15-T264	Volume tapped at 250KΩ - Rear
C	Switch					KS-1	U8-37	Attach to R1B
R2A	50KΩ		B40X96-C	Q11-133	A47-50K-S	AB-31	U-35	Horiz. Hold
B	Shaft		Not Req.	NQ	R8-3/16	AK-1	Not Req.	Attach to R2A
R3A	1. 5Meg		B40X334-E	Q11-138	A47-1.5Meg-S	AB-78	U-155	Tone
B	Shaft		Not Req.	NQ	R8-3/16	AK-4	Not Req.	Attach to R3A
R4A	500KΩ		B40X33-A	Q11-133	A47-500K-S	AB-59	U-50	Brightness
B	Shaft		Not Req.	NQ	R8-3/16	AK-3	Not Req.	Attach to R4A
R5A	1. 5Meg		B40X354-E	Q11-138	A47-1.5Meg-S	AB-78	U-155	Vert. Hold
B	Shaft		Not Req.	NQ	R8-3/16	AK-4	Not Req.	Attach to R5A
R6A	2. 5Meg		B40X369-A	Q11-139	A47-2.5Meg-S	AB-83	SU-585	AGC
B	Shaft		Not Req.	RQ	FK8-1/4	AK-1	Not Req.	Attach to R6A
R7A	2. 5Meg		B40X369-A	Q11-139	A47-2.5Meg-S	AB-83	SU-585	Height
B	Shaft		Not Req.	RQ	FK8-1/4	AK-1	Not Req.	Attach to R7A
R8A	800ΩΩ		B40X370	Q11-116	A47-10K-S	AB-14	SU-20	Vert. Linearity
B	Shaft		Not Req.	RQ	FK8-1/4	AK-1	Not Req.	Attach to R8A
R9A	7. 5Meg		B40X370-A	Q11-143	A47-7.5Meg-S	AB-89	U-85	Sync Stability
B	Shaft		Not Req.	Not Req.	FK8-1/4	AK-4	Not Req.	Attach to R9A

* CONCENTRITE EQUIVALENT: KIT K-4, BASE ELEMENTS & SHAFTS: B1-10S & P1-31S (PANEL)
B13-157X & R16-31S (REAR)
76-2 SWITCH

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA TRUETONE PART No.	IRC PART No.	NOTES
R10	22KΩ	½	12T-AE223K	BTS-22K	
R11	47KΩ	½	12T-AE473M	BTS-47K	
R12	820KΩ	½	12T-AE824T	BTS-820K	
R13	470KΩ	½	12T-AE474K	BTS-470K	
R14	150ΩΩ	1	12S-AE152K	BTA-150Ω	
R15	6800Ω	½	12T-AE682K	BTS-6800	
R16	100KΩ	½	12T-AE104K	BTS-100K	
R17	100KΩ	1	12S-AE104K	BTS-100K	
R18	100KΩ	½	12T-AE104K	BTS-100K	
R19	330ΩΩ 5%	½	12T-AE332K	BTS-330Ω 5%	
R20	10KΩ	½	12T-AE103M	BTS-10K	
R21	3300Ω	½		BTS-3300	
R22	3300Ω 5%	½		BTS-3300 5%	
R23	1000Ω	½		BTS-1000	
R24	470 5%	½		BTS-47 5%	
R25	470Ω	½		BTS-470	
R26	150Ω	½		BTS-150	
R27	39KΩ 5%	½		BTS-39K 5%	
R28	470 5%	½		BTS-47 5%	
R29	470Ω	½		BTS-470	
R30	150Ω	½		BTS-150	
R31	39KΩ 5%	½		BTS-39K 5%	
R32	180Ω	½		BTS-180	
R33	1500Ω	½		BTS-1500	
R34	3300Ω	½		BTS-3900	
R35	5600Ω	½		BTA-5600	
R36	1500Ω	½		BTS-1500	
R37	1Meg	½		BTS-1Meg	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA TRUETONE PART No.	IRC PART No.	NOTES
R38	68Ω	½		BTS-68	
R39	3000Ω 5%	2	D83203	BTS-3000 5%	
R40	3000Ω 5%	2	D83303	BTS-3000 5%	
R41	100KΩ	½		BTS-100K	
R42	1Meg	½		BTS-1Meg	
R43	47KΩ	½		BTS-47K	
R44	100KΩ	½		BTS-100K	
R45	22KΩ	½		BTS-22K	
R46	33KΩ	½		BTS-33K	
R47	47KΩ	½		BTS-47K	
R48	330KΩ 5%	½		BTS-330K 5%	
R49	100KΩ	½		BTS-100K	
R50	470KΩ	½		BTS-470K	
R51	2. 7Meg	½		BTS-2. 7Meg	
R52	100Ω	½		BTS-100	
R53	1000Ω	½		BTS-1000	
R54	56KΩ	½		BTS-56K	
R55	33KΩ	½		BTS-33K	
R56	33KΩ	½		BTS-33K	
R57	1000Ω	½		BTS-1000	
R58	270Ω	½		BTS-270	
R59	68KΩ	½		BTS-68K	
R60	10KΩ 5%	½		BTS-10K 5%	
R61	10KΩ 5%	½		BTS-10K 5%	
R62	68KΩ	½		BTS-68K	
R63	10Meg	½		BTS-10Meg	
R64A	500KΩ		†76X5	BTS-470K	
B	500KΩ			BTS-470K	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA TRUETONE PART No.	IRC PART No.	NOTES
R65	330Ω	½		BTA-330	
R66	1000Ω	½		BTS-1000	
R67	47KΩ	½		BTS-47K	
R68	10KΩ	½		BTS-10K	
R69	270KΩ	½		BTS-270K	
R70	1. 5Meg	½		BTS-1.5Meg	
R71	68KΩ	½		BTS-68K	
R72	330KΩ	½		BTS-330K	
R73	3300Ω 5%	½		BTS-3300 5%	
R74	3300Ω 5%	½		BTS-3300 5%	
R75A	22KΩ	½		BTS-22K	
B	6300Ω	½	*76X7	BTS-6200	
C	3300Ω	½		BTS-3300	
R76	22KΩ	½		BTS-22K	
R77	2. 2Meg	½		BTS-2. 2Meg	
R78	22KΩ	½		BTS-22K	
R79	1. 8Meg	½		BTS-1. 8Meg	
R80	2. 2Meg	½		BTS-2. 2Meg	
R81	200KΩ 5%	½		BTS-200K 5%	
R82	8200Ω	½		BTS-8200	
R83	2. 2Meg	½		BTS-2. 2Meg	
R84	820Ω	½		BTS-820	
R85	3300Ω	½		BTS-3300	
R86	560Ω	½		BTS-560	
R87	100KΩ	½		BTS-100K	
R88	4. 7Meg	½		BTS-4. 7Meg	

† Items R64A, R64B, C57A, C57B and C57C are combined in one unit.
• Items R75A, R75B, R75C, C62A, C62B and C62C are combined in one unit.
Note . Some versions use 100KΩ resistors in this Application.

TRANSFORMER (POWER)

ITEM No	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA TRUETONE PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No	Stancor PART No.	Thordarson PART No.	Triad PART No
T1	117VAC @ 1. 84A	590VCT .270ADC	5VAC @3A	53X339B		P-3838 ① ②				
	SEC. 3	SEC. 4	SEC. 5							
	6. 3VAC @ 9. 1A									

① Parallel and phase 6. 3V ⑤ 5. 6A winding for Sec. #3.
② Tape other two 6. 3V windings.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA TRUETONE PART No	Halldorson PART No	Merit PART No	RCA TYPE No	Rom PART No	Stancor PART No	Thordarson PART No	Triad PART No
T2	Vert. Osc. Trans	54X10	B6702	A-3003	209T1 ①	V405	A-8125	26A03	A-97X
T3	Horiz. Output Trans.	53X346	F2841 & RF8001③	HVO-9 & A-3037 & MWC-1④	232T1 & 212R1 * ①	X110 *	A-8252 & WC-5 ④	FLY-37 *	D-35 & WC-12 * ①
T4	Vert. Output Trans.	51X168	Z1806 ①	A-3039 ①	228T1 ①	V312 ①	A-8141 ①	26B54 ①	A-104X ①
T5A	Yoke-Horiz. (13. 5MH)	8A2334-1 ②	DF602 ③	MDF-72 ③	211D2 ③	Y70F14 ④	DY-8A ③	Y-4 ③	Y-17 ③
B	Vert. (40MH)				④				
T6	Horiz. Lin. Coil (1. 2-6. 5MH)	8A2262	RF800④⑤	MWC-6④	213R1 ④	202R15	WC-8	WC-22	WC-12④
T7	Width Coil (1. 6-. 6MH)	8A2183			208R4 ⑦	202R4 ⑦	WC-4 ⑦	WC-16 ⑦	

① Drill new mounting hole(s).
② Includes resistor R86.
③ Use original yoke damping network.
④ Enlarge mounting hole.
⑤ Connect to terminals #3 and #4.
⑥ Connect to coded blue and green terminals.
⑦ Use original slider, clip and core.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL (CONNECTIONS)	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Rom Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	6	9	9	10	13	9	13	10
	5	8	8	8	Jumper 10 & 11	Jumper 8 & 7	Jumper 10 & 11	8
	4	5	5	7	8	5	6	7
	3	See Note ⑤	See Note ⑤	See Note ⑤	5 or 4	See Note ⑤	5 or 4	See Note ⑤
	2	T	T	NC	2	3	2	NC
	1	1	1	3	1	1	1	3
	A	Term #3 of RF800	Orange Term of MWC-1	2	9	Red Term. of WC-5	9	2
	G	Term #4 of RF800	Black Term. of MWC-1	1	6	Blue Term. of WC-5	8	1
Connect Width Coil Across	2 & 1	Term. #1 & #2 of RF800 Across "T" & 1	Red & Blue terms of MWC-1 across "T" & 1	212R1 across 2 & 1	2 & 1	Orange & black term of WC-5 across 3 & 1	2 & 1	Red & blue terms of WC-12 across 2 & 1
Special Notes →		⑪⑬	⑬	⑫		⑬		⑬ ⑮

⑪ Connect a 47MMF or 56MMF capacitor from open end of R107 (orig. term. #3 connection) to term. #3 of yoke(red lead).
⑫ If the picture is out of phase, reverse width coil primary or secondary.
⑬ Jumper terms. #9 and "T".

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T8	5. 3KΩ	3. 7Ω	51X166	Z1107	A-2930	A-3677	24S51	S-3X	

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V C IMP	REPLACEMENT DATA TRUETONE PART No	REPLACEMENT DATA QUAM PART No	NOTES
SP1	6'	PM	3. 7Ω	12A516①	6A2①	① Model: 2D2534A
	8'	PM	3. 7Ω	12A518②	8A2①	② Model: 2D1536A
	10"	PM	3. 7Ω	12A519③	10A31	③ Model: 2D1538A

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA TRUETONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1A	Ant. Coil	0Ω	0Ω	8A2328-3				Channel 2
B	Ant. Coil	0Ω	0Ω	8A2329-3				Channel 3
C	Ant. Coil	0Ω	0Ω	8A2329-4				Channel 4
D	Ant. Coil	0Ω	0Ω	8A2329-5				Channel 5
E	Ant. Coil	0Ω	0Ω	8A2329-6				Channel 6
F	Ant. Coil	0Ω	0Ω	8A2329-7				Channel 7
G	Ant. Coil	0Ω	0Ω	8A2329-8				Channel 8
H	Ant. Coil	0Ω	0Ω	8A2329-9				Channel 9
I	Ant. Coil	0Ω	0Ω	8A2329-10				Channel 10
J	Ant. Coil	0Ω	0Ω	8A2329-11				Channel 11
K	Ant. Coil	0Ω	0Ω	8A2329-12				Channel 12
L	Ant. Coil	0Ω	0Ω	8A2329-13				Channel 13
L2	Neut. Coil	0Ω		31B-727				
L2A	RF, Mixer Grid & Osc. Coils	0Ω		8A2330-2				Channel 2
B	RF, Mixer Grid & Osc. Coils	0Ω		8A2330-3				Channel 3
C	RF, Mixer Grid & Osc. Coils	0Ω		8A2330-4				Channel 4
D	RF, Mixer Grid & Osc. Coils	0Ω		8A2330-5				Channel 5
E	RF, Mixer Grid & Osc. Coils	0Ω		8A2330-6				Channel 6
F	RF, Mixer Grid & Osc. Coils	0Ω	a	8A2330-7				Channel 7
G	RF, Mixer Grid & Osc. Coils	0Ω		8A2330-8				Channel 8
H	RF, Mixer Grid & Osc. Coils	0Ω		8A2330-9				Channel 9
I	RF, Mixer Grid & Osc. Coils	0Ω		8A2330-10				Channel 10
J	RF, Mixer Grid & Osc. Coils	0Ω		8A2330-11				Channel 11
K	RF, Mixer Grid & Osc. Coils	0Ω		8A2330-12				Channel 12
L	RF, Mixer Grid & Osc. Coils	0Ω		8A2330-13				Channel 13
L4	Conv. Plate	.1Ω		31K-104				
L5	IF Trap	.1Ω		8A2320	I7-4522 *	TV-13C *	6219 *	
L6	1st. Video IF	0Ω		8A2316	I7-5003	TV-13S *	6231	
L7	2nd. Video IF	.1Ω	.1Ω	8A2317	I7-5003	TV-13S	6218 ■	Includes 47. 25MC trap
L8	Fil. Choke	0Ω		8A2033	19-1002		4806	2. 2 Microhenries
L9	3rd. Video IF	.1Ω	.1Ω	8A2318	I7-5001	TV-13S ▲	6233 ▲	
L10	Fil. Choke	0Ω		8A2033	19-1002		4806	2. 2 Microhenries
L11	Parasitic Suppressor	0Ω		8A2322				1 turn wire-wound on 10KΩ resistor
L12	Cathode Trap	0Ω		8A2321				
L13	4th. Video IF	.4Ω	.4Ω	8A2319	I7-5004	TV-13S	6234	
L14	Series Peaking Coil	7Ω		38A10	19-3075		6175	60 Microhenries
L15	Shunt Peaking Coil	17Ω		38A23	19-3300	TV-18S	6155	280 Microhenries
L16	4. 5MC Trap	.2Ω		8A3074	20-1004	TV-18I	1469	
L17	Shunt Peaking Coil	20Ω		38A1	19-3100	TV-18I	6177	100 Microhenries
L18	Shunt Peaking Coil	9. 5Ω		38A35	19-3100 ♦	TV-18I ♦	6177 ♦	100 Microhenries, wound on 470Ω resistor
L19	Series Peaking Coil	12. 5Ω		38A15	19-4180	TV-18A ■	6180 ■	180 Microhenries, wound on 22KΩ resistor
L20	Shunt Peaking Coil	14Ω		38A2	19-4201	TV-18A	6154	190 Microhenries
L21	1st. Sound IF	2Ω		8A2301	I7-1031 ■	TV-13 *	6203 *	
L22	2nd. Sound IF	2. 4Ω	2Ω	8A2323	I7-1021	TV-13	6203	
L23	Ratio Det.	5. 6Ω	. 5OCT	8A2295	I7-3497	TV-11S	6208	Tertiary winding-. 5Ω
L24	Horiz. Osc.	95Ω		8A2096	19-1570	TV-18S	6210	

* Use one winding only.
■ Drill mounting holes.
▲ Deluxe trap.
• Parallel with 470Ω resistor.
♦ Parallel with 22KΩ resistor.

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L25	.270ADC	40.6Ω	.83 HY	52X95	C5037 ①	C-2996 ①	C-2326 ①	26C44	C-23X ①

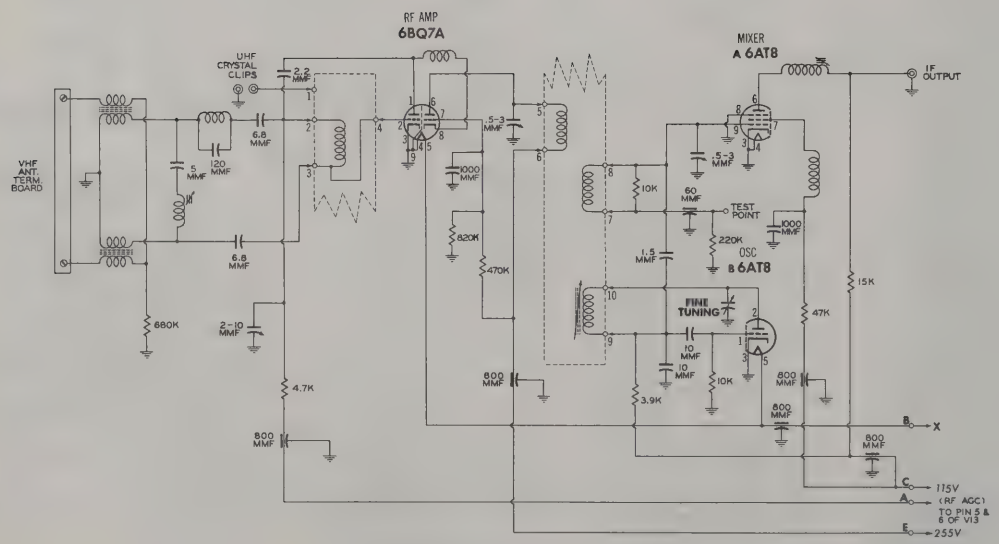
① Drill one new mounting hole .

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			TRUETONE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	4/10A 125V		16X146	313.400 (3AG S/B-4/10A)	357001	MDL 4/10	4405

MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M2	Tuner	25A1125	VHF Models 2D1534A and 2D2534A
	Tuner	25A1127	VHF Models 2D1534A and 2D2534A
M3	Tuner	25A1128	UHF -VHF Model 2D1536A
M4	Trap	31K-919	VHF antenna input filter - used with tuner 25A1125
	Trap	31K-225-03	VHF antenna input filter - Model 2D1536A
M5	Focus Magnet	2A438-2	Includes centering device
M6	Ion Trap	2A421	
B2	Trimmer Cap.	17A269	Horiz. Drive (120-400MMF)
	Knob	10A820-1	Fine tuning - Mahogany cabinet - Models 2D1534A, 2D2534A
	Knob	10A840-1	Contrast - Mahogany cabinet - Models 2D1534A, 2D2534A
	Knob	10A842-1	Channel Selector - Mahogany Cabinet-Model 2D1534A, 2D2534A
	Knob	10A843-1	On-off-volume - Mahogany Cabinet-Model 2D1534A, 2D2534A
	Knob	10A846-1	Fine tuning - Model 2D1536A
	Knob	10A853-1	UHF channel selector - Model 2D1536A
	Knob	10A852-1	VHF channel selector - Model 2D1536A
	Knob	10A847-1	Contrast - Model 2D1536A
	Knob	10A830-1	On-off-volume - Model 2D1536A
	Safety Glass	17X187	
	Mask	4X1241-6	



VHF TUNER 25A1127 USED WITH MODELS 2D1534A, AND 2D2534A

A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1956

ALTERNATE TUNER SCHEMATIC

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. F. BLANKENSHIP
3924 MONDE ST.
DENVER, COLORADO

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution-V18, V19, V20 and V21. Check waveform W18.

If Satisfactory	If Unsatisfactory
Check T3, T5A, T6, T7, C82, C81, C84, C80, R103, R104, and other associated components.	Check L24, C76, C77, R95, R98, R94, R96 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V19, V20 and V22. Check T3, T5A, R103, R104, and other associated components.

BLOOMING

Check by substitution V19, V20, V21 and V22. Check R109, R103, R104, R102, C7 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss Of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak Or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5, V6, V7 and V8. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

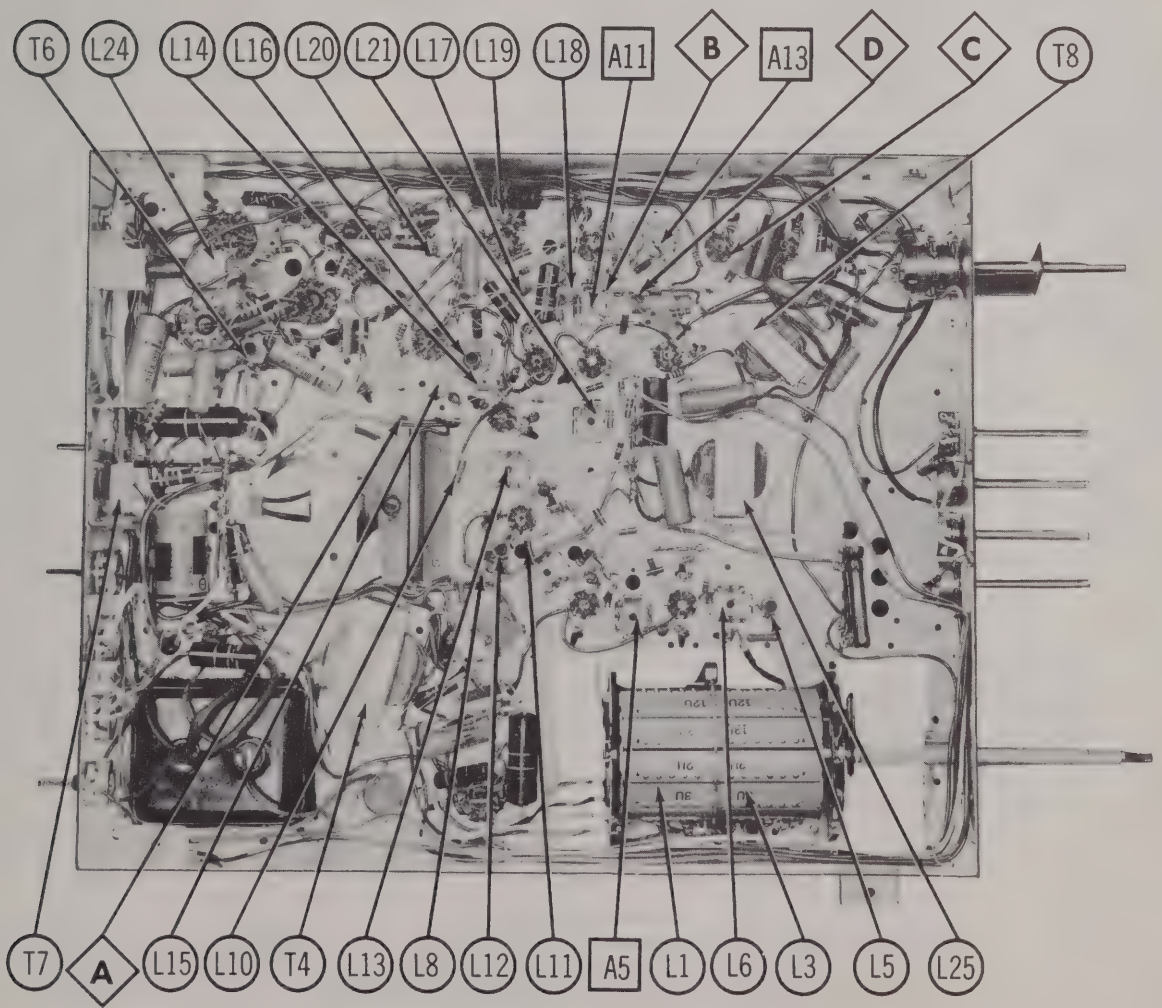
KEYSTONE EFFECT

Check T5 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF Tuner oscillator Circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible , one at a time, through the small hole in the cabinet above and slightly to the left of the channel selector shaft.

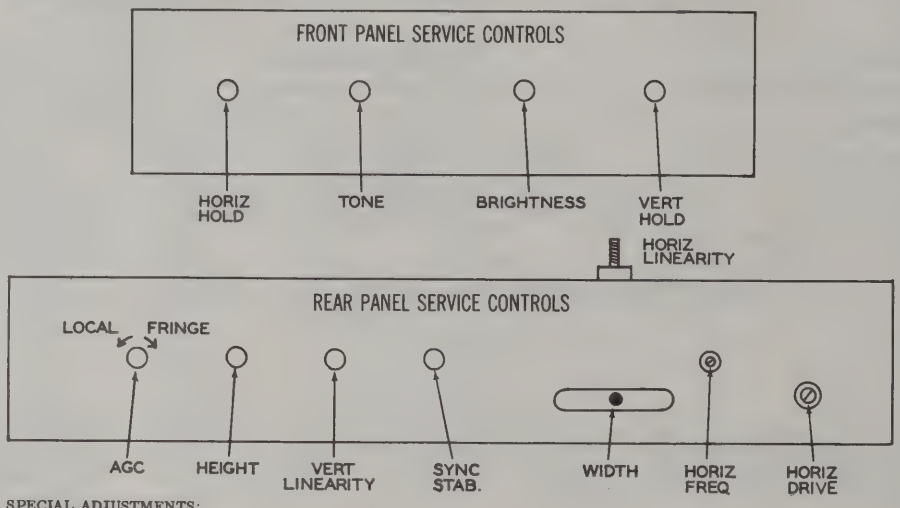
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 5 wood screws holding plastic strip at the top of the safety glass. Remove plastic strip and safety glass. The extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



SPECIAL ADJUSTMENTS:

AGC CONTROL ADJUSTMENT

Turn set on and tune in strongest station in that area. Turn the AGC control(R6) clockwise until the picture shows signs of overloading, faded out picture and buzz in sound. Turn R6 back counter clock wise from the point where overloading occurs until no sign of overloading is noted.

SYNC STABILITY CONTROL ADJUSTMENTS

Turn set on and tune in strongest TV station in that area. Rotate the sync stability control (R9) clockwise until bending is noted near the top of picture. Turn R9 counter clock wise until picture bending disappears and sync is stable.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontol hold control at its mid-range position and adjust the horzontol frequency slug (L24) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz adjust the ratio detector secondary (L23) located on top of chassis.

FUSES

One fuse is used for L.V. power supply protestion. (For location see tube placement chart.)

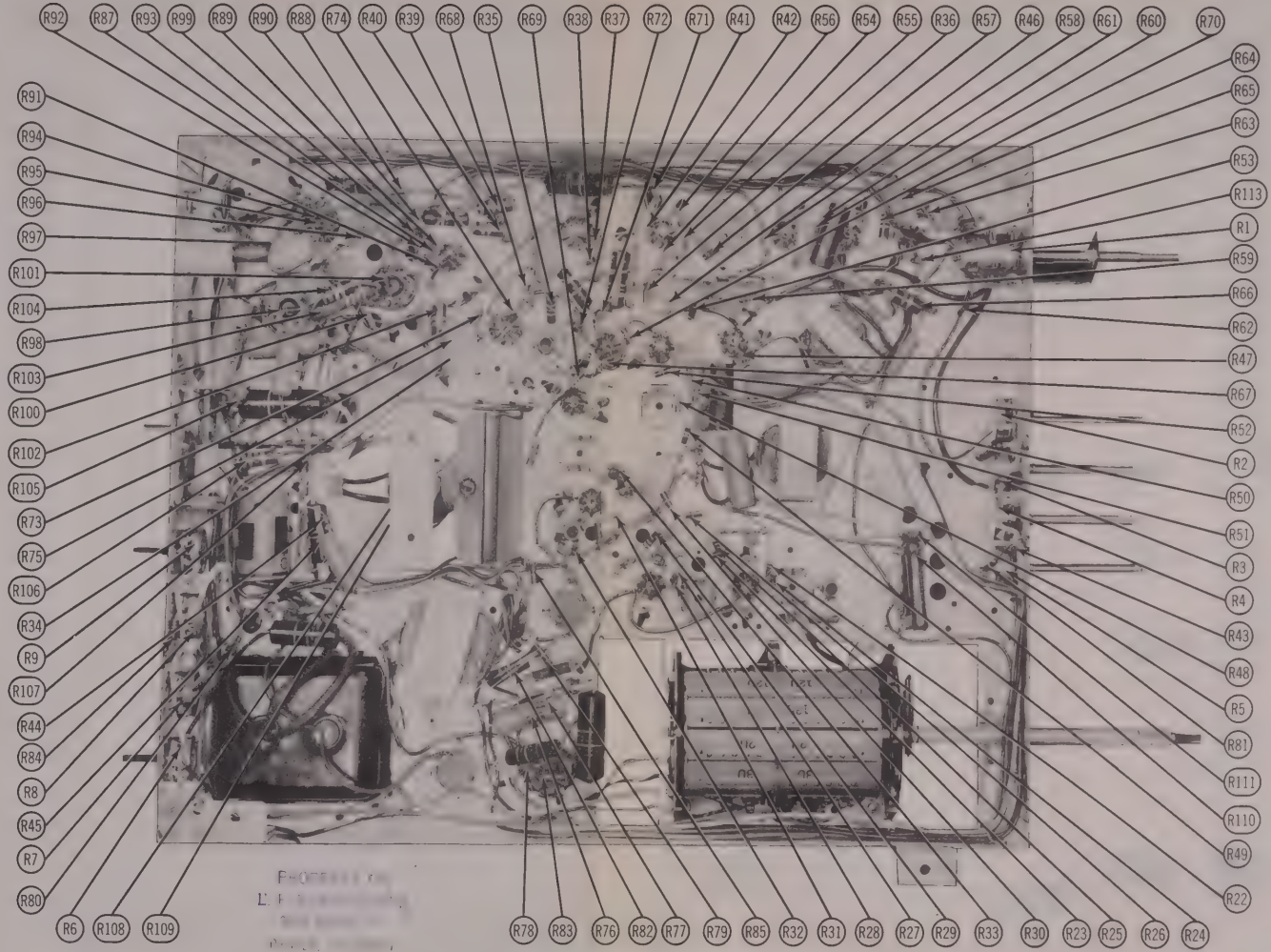
CENTERING

Centering is accomplished mechanically by means of a centering lever on the P.M Focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 push-on type control knobs from front panel of cabinet.
2. Remove 4 wood screws. Remove rear cover.
3. Remove 2 wood screws holding antenna bracket.
4. Disconnect speaker leads.
5. Remove 4 speaker nuts. Remove speaker.
6. Remove 5 chassis bolts. Remove chassis.

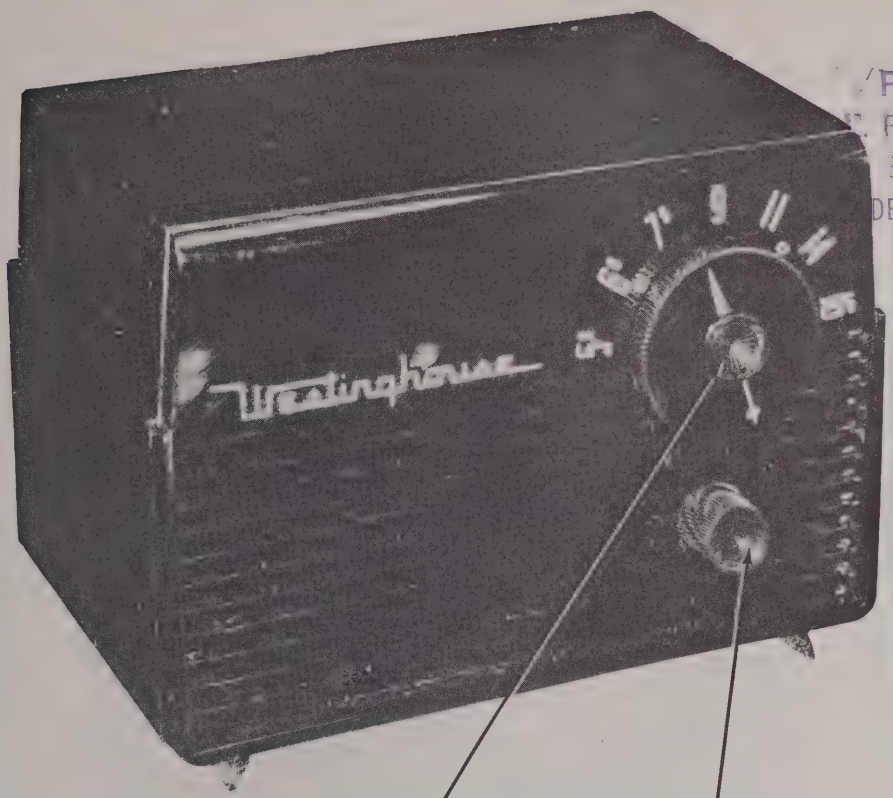


CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

WESTINGHOUSE MODELS H-523T4, H-524T4, H-525T4, H-538T4, H-539T4, H-540T4 (Ch. V-2239-1, -2)

WESTINGHOUSE MODELS H-523T4, H-524T4, H-525T4, H-538T4, H-539T4, H-540T4 (Ch. V-2239-1, -2)

PROPERTY OF
F. BLANKENSHIP
39[illegible] MYRTLE ST.
DENVER, COLORADO



WESTINGHOUSE MODELS H-523T4, H-524T4, H-525T4, H-538T4, H-539T4, H-540T4 (Ch. V-2239-1, -2)

TRADE NAME	Westinghouse Models H-523T4, H-524T4, H-525T4, H-538T4,A, H-539T4, A, H-540T4, A (Ch. V-2239-1, -2)
MANUFACTURER	Westinghouse Electric Corp., TV-Radio Div., Metuchen, N. J.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver (Ch. V-2239-2 Employs Electric Clock)
TUBES (Four)	Types 12AU6 Conv., 12AV6 Det. -AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-DC (Ch. V-2239-2 AC only) RATING .23 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1600KC

ALIGNMENT INSTRUCTIONS

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	200MMF	High side to antenna stator lug thru dummy. Low side to B-.	455KC (400% Mod.)	Tuning gang fully open.	Across Voice Coil	A1, A2	Adjust for maximum output.
2.		Loop (Radiated)	1625KC	"	"	A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal.	"	A4	"

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

WESTINGHOUSE
Model H-523T4

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		Westinghouse PART No.	STANDARD REPLACEMENT		
V1	Converter	12AU6	12AU6	7BK	
V2	Det.-AF-Amp.	12AV6	12AV6	7BT	
V3	Audio Output	50C5	50C5	7CV	
V4	Rect.	35W4	35W4	5BQ	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	Westinghouse PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	
C1A	40	150	V-15774-1	FP210	TM-4020-150	D-055	
B	20	150					

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA				NOTES
	CAP.	VOLT.	Westinghouse PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	
C2	47		V-8963-4709	TCZ-47	NPO-338-470	ZT-5447	
C3	.68		217VO168A88	TCZ-R68	NPOA-OR68		
C4	2.2		V-8963-2297	TCZ-2R2	NPOA-2R2		
C5A	220						
B	5000						
C	5000		♦V-15542-1	♦PC-158			
D	250						
E							
C6	10000		R2CC63Z5Z103P	DD-103	811-01	DC511	
C7	.047	400	V-10157-4473M	DF-503		PT4147	
C8	10000		R2CC63Z5Z103P	DD-103	811-01	DC511	

♦ Items C5A, C5B, C5C, C5D, C5E, R4, R4, and R4 are combined in one unit.
When replacing items separately C5D and C5E should total 250.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Westinghouse PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1	2Meg	½	V-15767-1					Volume and switch-See note 1
	2Meg	½	V-15767-2					Volume-See Note 2

Note 1. Used in chassis V-2239-1.
Note 2. Used in chassis V-2239-2.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Westinghouse PART No.	IRC PART No.	
R2	2.2Meg	½	250V232A25	BTS-2.2Meg	
R3	4700Ω	½	250V234A72	BTS-4700	
R4A	6.8Meg			BTS-6.8Meg	
B	470KΩ		♦V-15542-1	BTS-470K	
C	470KΩ			BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	Westinghouse PART No.	IRC PART No.	
R5	150Ω	½	250V231A51	BTS-150	
R6	6800Ω	½	250V236A82	BTS-6800	
R7	15Ω	2	V-6067-17		

♦ Items R4A, R4B, R4C, C5A, C5B, C5C, C5D and C5E are combined in one unit.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.4KΩ	3.3Ω	Part of spkr.	Z1101	A-3025	A-3332	26S58 ①	S-12X	① Drill one new mounting hole.

SPEAKER

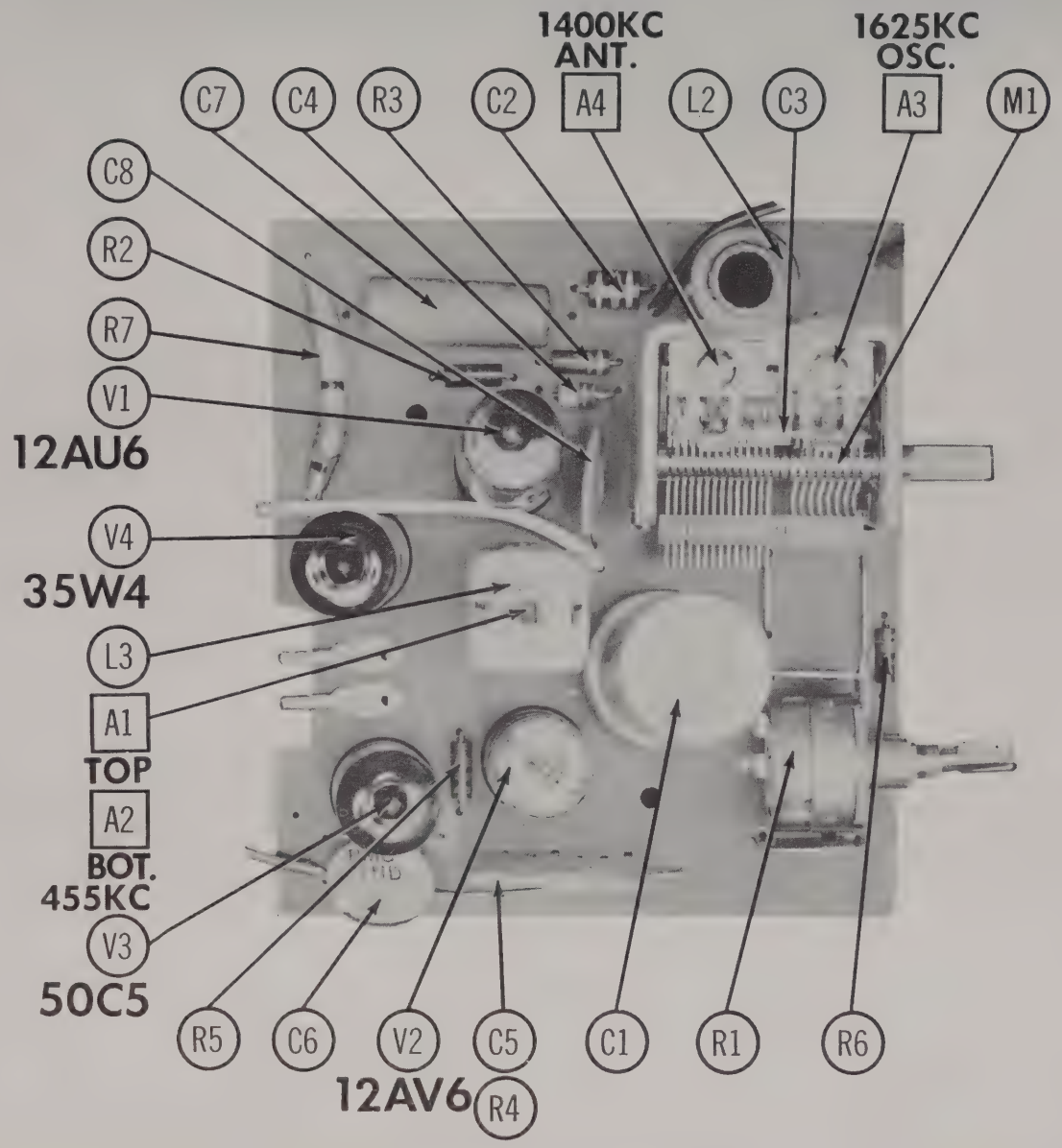
ITEM No.	RATINGS			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Westinghouse PART No.	QUAM PART No.	
SP1	4"	PM	3.3Ω	V-15557-1	4A07	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Westinghouse PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	5Ω		V-15775-1				Includes cabinet back.
L2	Osc. Coil	2.6Ω	12Ω	V-15784-1				Tertiary winding=3.6Ω
L3	IF Trans.	35Ω*	35Ω	V-15766-1				*Tapped ⓐ .7Ω.

MISCELLANEOUS

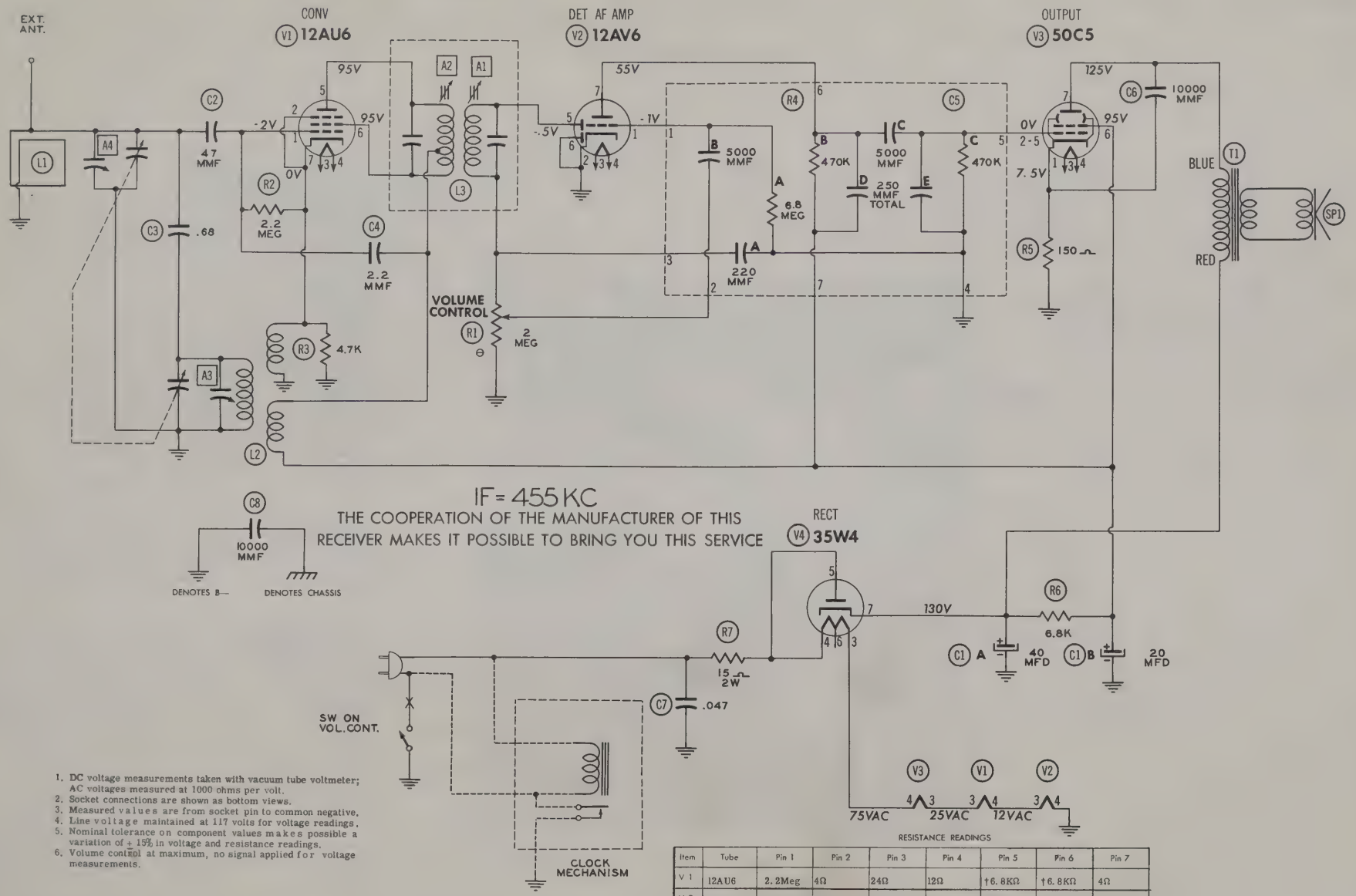
ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M1	Tuning Cap.	V-15768-1	2 Gang (Capacity Values Unobtainable)
	Cabinet	V-1419-1	Model H-523T4
	Cabinet	V-1419-2	Model H-524T4
	Cabinet	V-1419-3	Model H-525T4
	Cabinet	V-1420-1	Model H-538T4
	Cabinet	V-1420-2	Model H-539T4
	Cabinet	V-1420-3	Model H-540T4
	Knob	V-15759-3	Tuning-Model H-523T4
	Knob	V-15759-2	Tuning-Model H-524T4
	Knob	V-15759-1	Tuning-Model H-525T4
	Knob	V-15549-6	Tuning-Model H-538T4
	Knob	V-15549-7	Tuning-Model H-539T4
	Knob	V-15549-8	Tuning-Model H-540T4
	Knob	V-14483-13	On-off-volume-Model H-523T4, H-538T4
	Knob	V-14483-22	On-off-volume-Model H-524T4, H-539T4
	Knob	V-14483-24	On-off-volume-Model H-525T4, H-540T4
	Knob	V-12399-3	Clock (Off-on-automatic)-Chassis V-2239-2
	Crystal	V-14477-1	Clock-Chassis V-2239-2



CHASSIS-TOP VIEW

SET 301 FOLDER 14

WESTINGHOUSE
Model H-5237T



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12AU6	2.2Meg	4Ω	24Ω	12Ω	†6.8KΩ	†6.8KΩ	4Ω
V 2	12AV6	6.8Meg	0Ω	12Ω	0Ω	2Meg	0Ω	†476KΩ
V 3	50C5	150Ω	470KΩ	24Ω	74Ω	470KΩ	†6.8KΩ	†150Ω
V 4	35W4	TP	TP	74Ω	109Ω	109Ω	104Ω	70KΩ

†MEASURED FROM PIN 7 OF V4.
TP-TIE POINT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1955

PHOTOFACT* Folder

*TRADE MARK

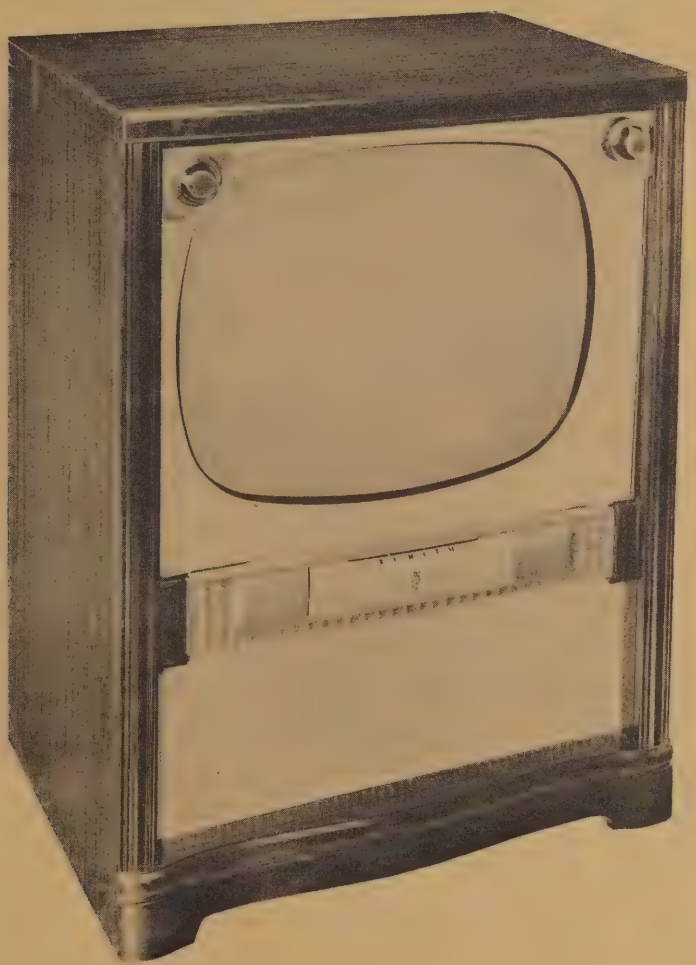
RETMA MEMBER

ZENITH MODELS
T2670E, EU, R, RU (Ch. 19T23)

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



PROPERTY OF
L. F. DI[illegible]SHIP
[illegible] MAIN ST.
DENVER COLORADO

MODEL T2670R

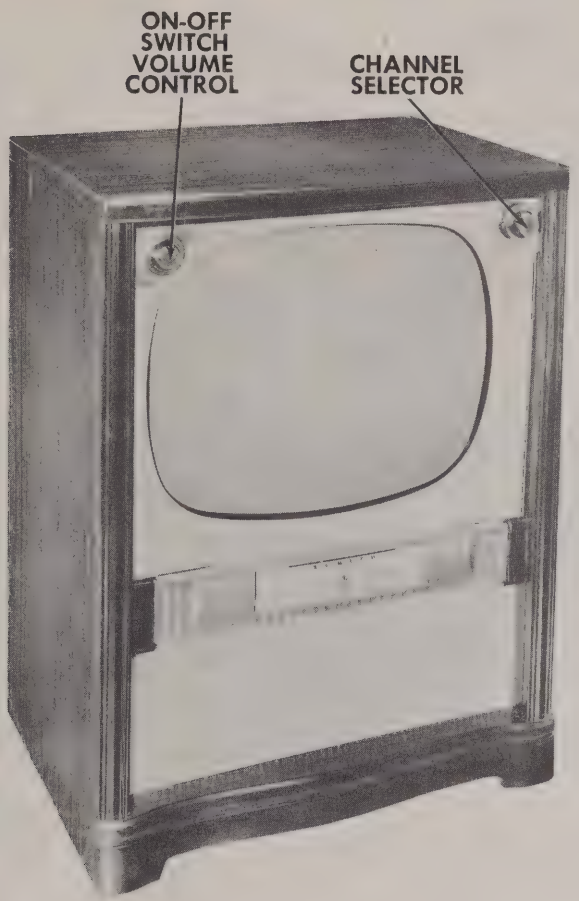
ZENITH MODELS
T2670E, EU, R, RU (Ch. 19T23)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 12–55 SET 301 FOLDER 15

ZENITH MODELS
T2670E, EU, R, RU (Ch. 19T23)



PROPERTY OF
L. F. BLANKENSHIP

ZENITH MODEL T2670R

TRADE NAME	Zenith Models T2670E, T2670EU, T2670R, T2670RU (Ch. 19T23)
MANUFACTURER	Zenith Radio Corporation, 6001 Dickens Avenue, Chicago 39, Illinois
TYPE SET	Telvision Receiver
TUBES	Nineteen
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 1.9 Amp. @ 117 Volts AC
TUNING RANGE -	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

INDEX

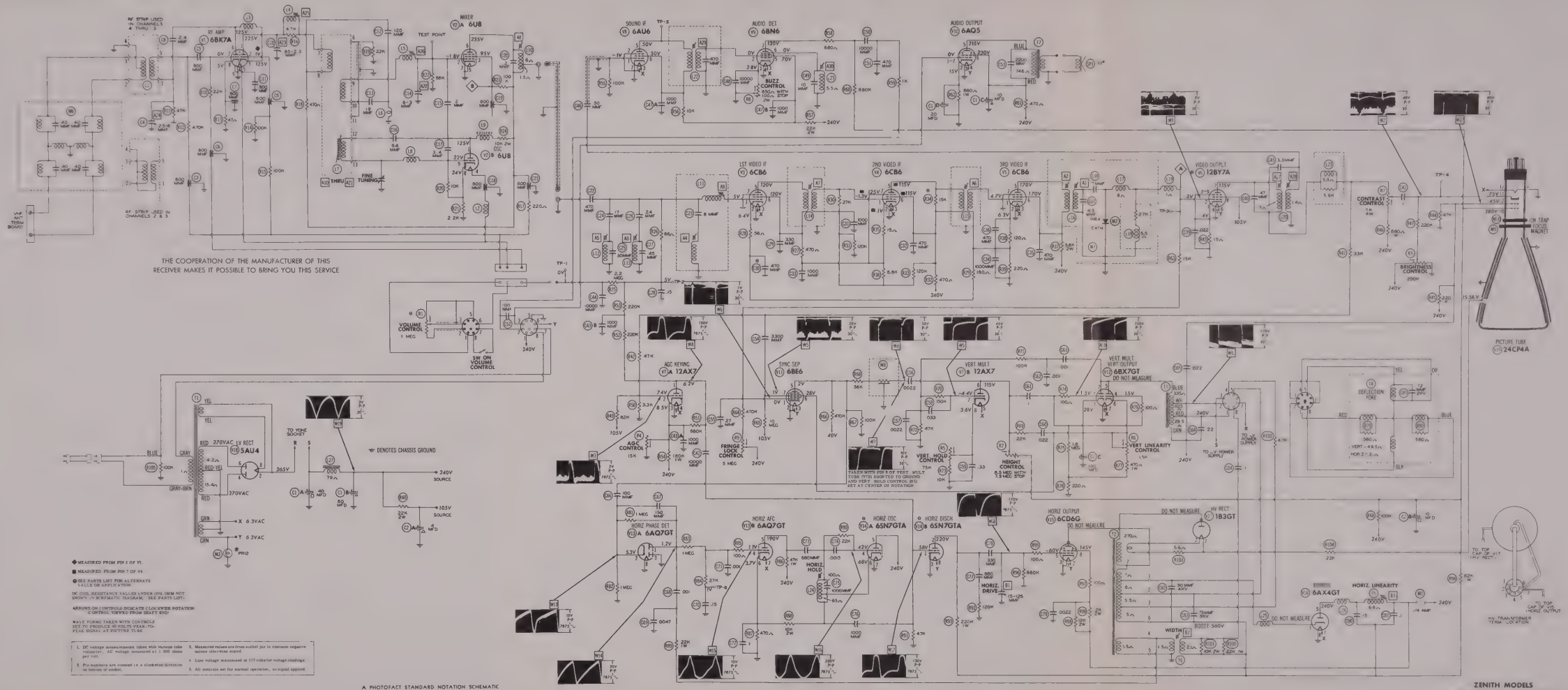
Alignment Instructions 6, 7
Disassembly Instructions 7
Horizontal Sweep Circuit Adjustments 11
Parts List and Descriptions 14, 15, 16
Photographs
- Cabinet-Rear View 11
- Capacitor Identification 4, 9
- Chassis-Top View 3
- RF Tuner 10, 16
- Resistor Identification 19, 20
- Trans., Inductor & Alignment Identification 17

Resistance Measurements 8
Servicing in the Field 18
Schematic (Alternate Tuner) 13
Schematic (TV) 2
Trouble Shooting Aids 12, 17
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

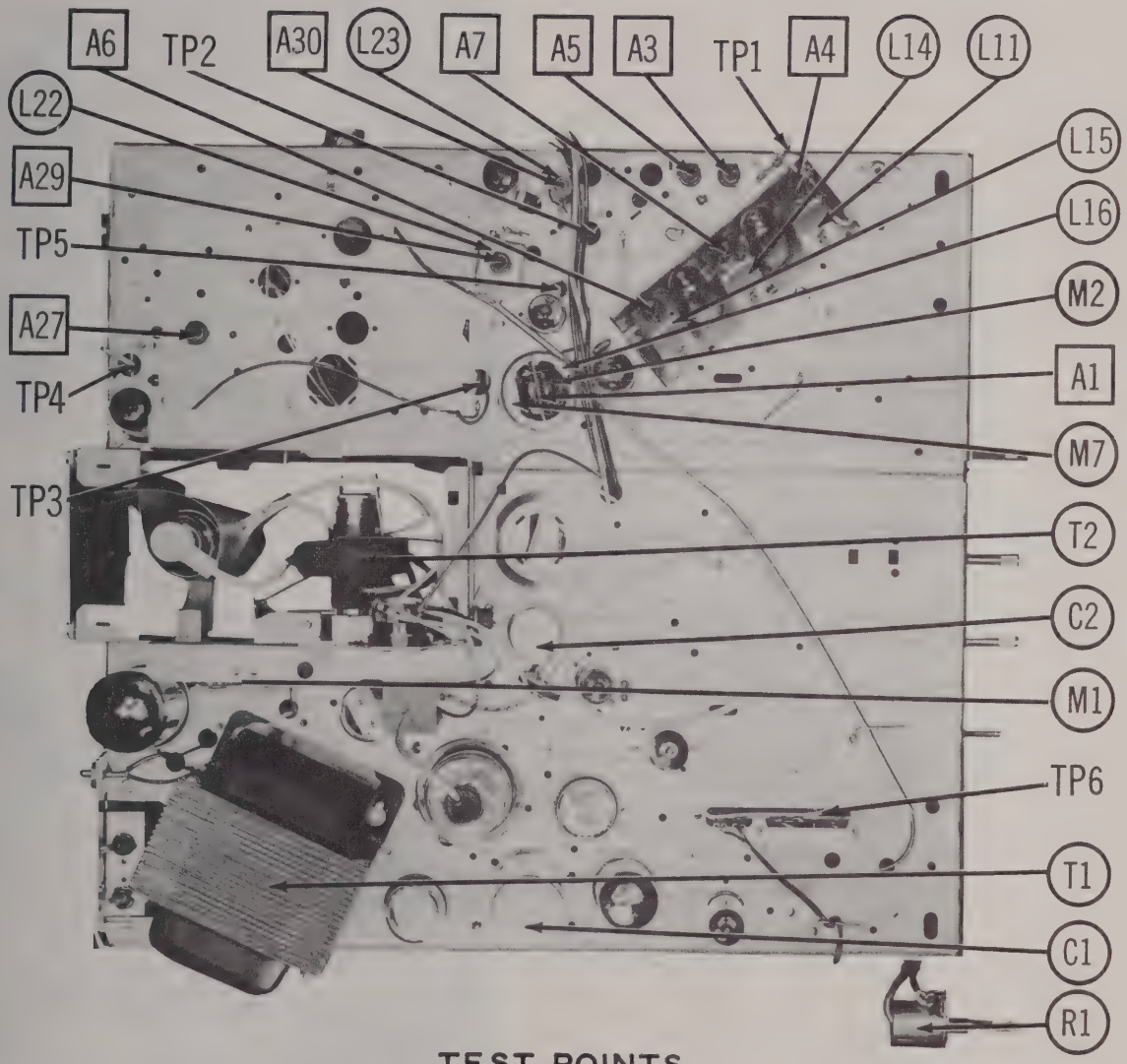
"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1955 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

ZENITH MODELS
T2670E, EU, R, RU (Ch. 19T23)


THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
RF AMP V1 6BK7A
MIXER V2A 6U8
OSC V2B 6U8
SOUND IF V8 6AU6
AUDIO DET V9 6BN6
AUDIO OUTPUT V10 6AQ5
1ST VIDEO IF V3 6CB6
2ND VIDEO IF V4 6CB6
3RD VIDEO IF V5 6CB6
VIDEO OUTPUT V6 12BY7A
AGC KEYING V7A 12AX7
SYNC SEP V11B 6BE6
VERT MULT V7B 12AX7
VERT MULT VERT OUTPUT V12 6BX7GT DO NOT MEASURE
HORIZ PHASE DET V13A 6AQ7GT
HORIZ AFC V13B 6AQ7GT
HORIZ OSC V14A 6SN7GTA
HORIZ DISCH V14B 6SN7GTA
HORIZ OUTPUT V15 6CD6G DO NOT MEASURE
HV RECT V17 1B3GT
HORIZ LINEARITY V16 6AX4GT
PICTURE TUBE V11 24CP4A
RECT V10 5AU4
VOLUME CONTROL 1 MEG
SW ON VOLUME CONTROL
CONTRAST CONTROL
BRIGHTNESS CONTROL
DEFLECTION YOKE
VERT LINEARITY CONTROL
HEIGHT CONTROL 6.5 MEG WITH 7.5 MEG STOP
VERT HOLD CONTROL
FRINGE LOCK CONTROL 5 MEG
AGC CONTROL
HORIZ HOLD
HORIZ DRIVE
WIDTH
BOOST 560V
ION TRAP FOCUS MAGNET
TO YOKE SOCKET
DENOTES CHASSIS GROUND
240V SOURCE
105V SOURCE
270VAC
6.3VAC
265V
TP-1
TP-2
TP-3
TP-4
TP-5
TEST POINT
FINE TUNING
RF STRIP USED IN CHANNELS 1 THRU 6
RF STRIP USED IN CHANNELS 2 & 3
TAKEN WITH PIN 5 OF VERT MULT TUBE (V7B) SHORTED TO GROUND AND VERT HOLD CONTROL (R73) SET AT CENTER OF ROTATION
◆ MEASURED FROM PIN 3 OF V1.
■ MEASURED FROM PIN 7 OF V4.
● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN IN SCHEMATIC DIAGRAM. SEE PARTS LIST.
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION OF CONTROL VIEWED FROM SHAFT END
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 60 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1955
ZENITH MODELS T2670E, EU, R, RU (Ch. 19T23)

ZENITH MODELS T2670E, EU, R, RU (Ch. 19T23)

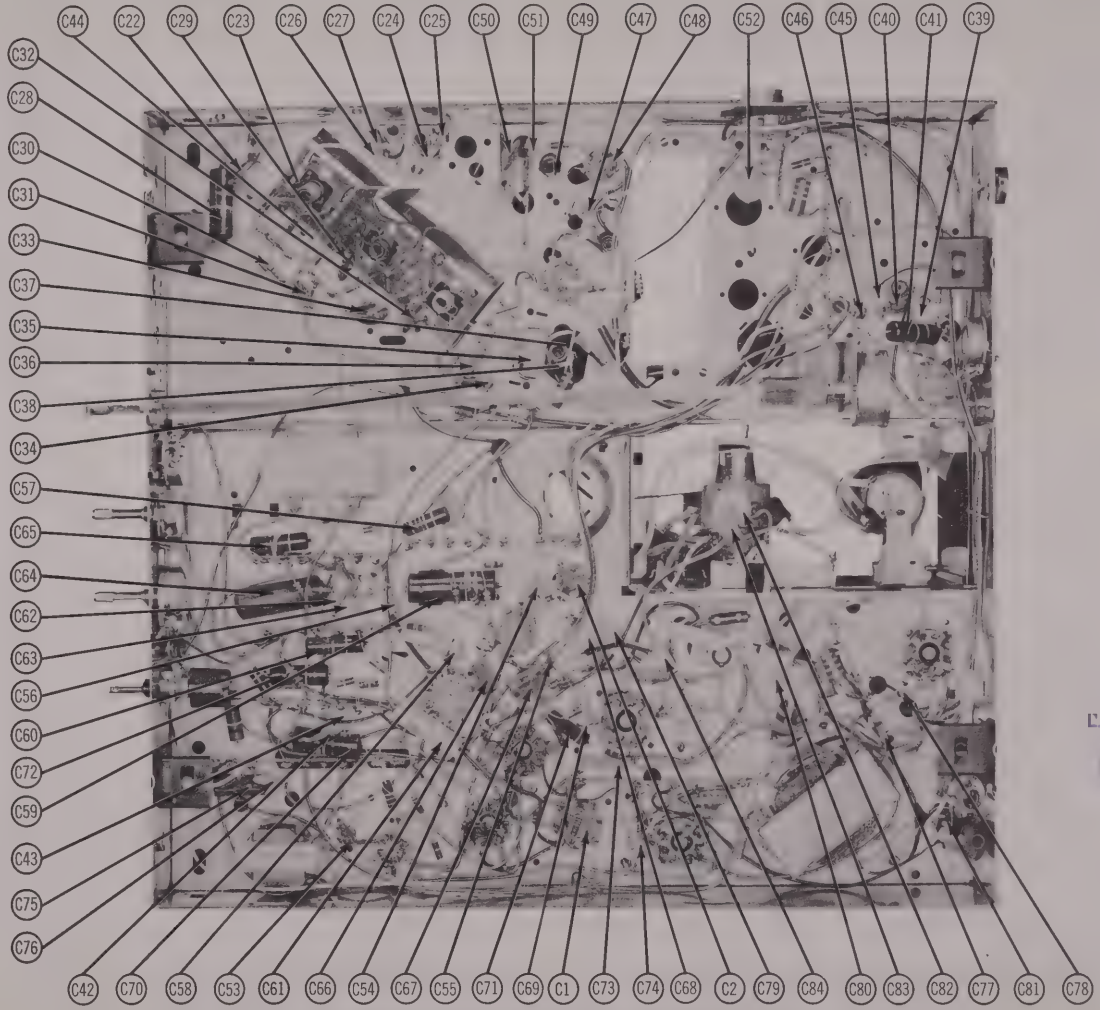
PROPERTY OF
L. F. [illegible]IP
[illegible] ST.
DENVER, COLORADO



TEST POINTS

(1) TUNER AGC (0V.)
(2) IF AGC (5V.)
(3) VIDEO DET. OUTPUT (-.2V.)
(4) VIDEO OUTPUT (75V.)
(5) SOUND IF PLATE (50V.)
(6) AFC (1V.)

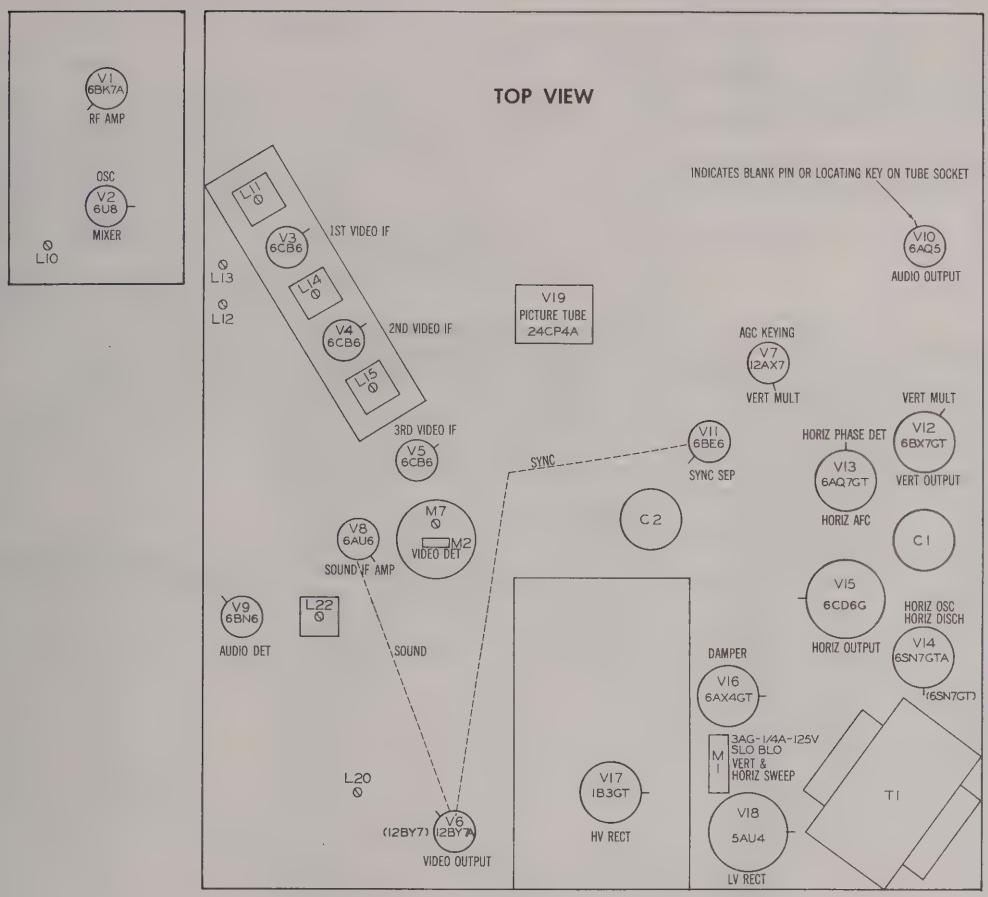
CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

PROPERTY OF
L. F. BLANKENSHIP
2924 MEA[illegible]

TUBE PLACEMENT CHART



PROPERTY OF
L. F. BLANKENSHIP
3024 MEADE ST
DENVER COLORADO

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound -V18

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V7, V19
Has pic, no sound - V8, V9, V10
Overloaded picture - V7

SYNC FAILURE
No vert. sync - V7, V11, V12
No horiz. sync - V11, V13, V14
No vert. or horiz. sync - V11

SWEEP FAILURE
No raster, has sound - V14, V15, V16, V17, V19, Fuse (M1)
No vertical deflection - V7, V12
Poor vert. linearity or foldover - V7, V12
Poor horiz. linearity or foldover - V14, V15, V16
Narrow picture - V14, V15, V16, V17, V18
Vert. off freq. - V7, V11, V12
Horiz. off freq. - V11, V13, V14

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis. Connect yoke and picture tube during alignment.

VIDEO IF ALIGNMENT

Connect the negative lead of a 2 volt battery to the ungrounded side of C28. Connect the positive lead to chassis. Turn the tuner turret to a position mid-way between any two channels.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	470MMF	High side to pin 1 (grid) of 6CB6 (V5). Low side to chassis.	44MC (10MC Swp)	39.75MC 45.75MC	Between any two channels	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A1, A2	Adjust for response curve similar to Fig. 1. If correct response cannot be obtained, check to see that the slugs are entering the coils from the outside ends of coils.
2.	"	High side to point Ⓑ. Low side to chassis.	"	39.75MC 41.25MC 47.75MC	"	"	A3, A4, A5	Reduce bias to zero. Turn sweep generator output to maximum. Increase gain on scope to magnify trap portions of response curve. Adjust traps for response similar to Fig. 2.
3.	"	"	"	42.75MC 45.0MC 45.75MC	"	"	A6, A7, A8, A9	Replace 2 volt bias. Adjust for response curve similar to Fig. 3. Readjustment of A1 and A2 should not be required to obtain desired response.

OSCILLATOR ALIGNMENT

The master oscillator adjustment (L18) is to be made only if the adjustment of the individual channel oscillator adjustments fail to bring the channels within range of the fine tuning control. If channels 2 thru 6 fall within the range of the fine tuning control, but the higher channels do not, slightly readjust L18 to bring in the higher channels. If channels 2 thru 6 do not fall within tuning range, readjust the bulls-eye adjustment on rear of tuner.
Connect the negative lead of a 1 volt bias to the ungrounded side of C28. Positive lead to chassis. Turn the oscilloscope gain up so that the sound trap notch in the response curve becomes visible.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	57MC (10MC Swp)	59.75MC	2	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A10	Adjust to place sound marker in trap notch as shown in Fig. 4.
			63MC (10MC Swp)	65.75MC	3		A11	
			69MC (10MC Swp)	71.75MC	4		A12	
			79MC (10MC Swp)	81.75MC	5		A13	
			85MC (10MC Swp)	87.75MC	6		A14	
			177MC (10MC Swp)	179.75MC	7		A15	
			183MC (10MC Swp)	185.75MC	8		A16	
			189MC (10MC Swp)	191.75MC	9		A17	
			195MC (10MC Swp)	197.75MC	10		A18	
			201MC (10MC Swp)	203.75MC	11		A19	
			207MC (10MC Swp)	209.75MC	12		A20	
			213MC (10MC Swp)	215.75MC	13		A21	

FIG. 1

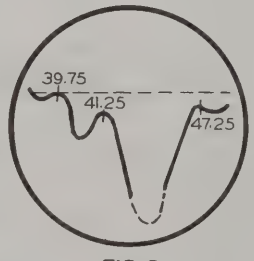


FIG. 2

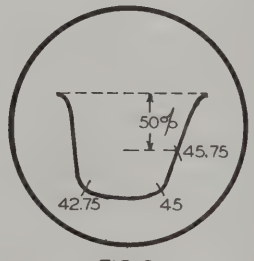


FIG. 3

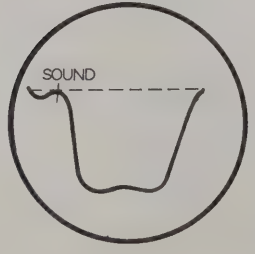


FIG. 4

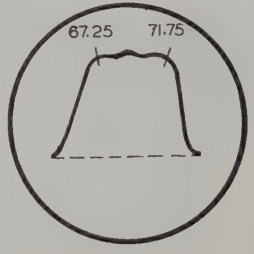


FIG. 5

ALIGNMENT INSTRUCTIONS (cont)

RF AND MIXER ALIGNMENT

Leave bias connected as under "Oscillator Alignment".

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	69MC (10MC Swp)	67.25MC 71.75MC	4	Vert. Amp. to point Ⓑ. Low side to chassis.	A22, A23, A24	Adjust for response curve similar to Fig. 5.
6.	"	"	201MC (10MC Swp)	199.25MC 203.75MC	11	"	A25, A26	Adjust for response curve similar to Fig. 6.

SOUND IF ALIGNMENT

Connect an attenuator (Zenith part #S-17203 or equivalent) in series with the receiver antenna.
Tune in a tone modulated TV signal and adjust the attenuator until the signal falls below the limiting level of the audio detector (6BW6) as evidenced by a hiss similar to regeneration.
Adjust the sound take-off transformers (A27 and A28), the sound IF coil (A29) and the quadrature coil (A30) for maximum sound of best quality. Adjust the buzz control (R8) for minimum intercarrier buzz.
If the intercarrier buzz cannot be eliminated with the buzz control, check the AGC control setting.
If during alignment the signal rises above the limiting level (hiss disappears), increase the attenuation until hiss returns.

UHF TUNER ALIGNMENT

Alignment of the UHF tuner should not be attempted unless proper test equipment is available.
Switch tuner to UHF position.
Leave bias connected as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Fig. 8	Across UHF antenna terminals thru matching network (Fig. 8).	713MC (10MC Swp)	711.25MC	54	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.	A31	Tuner rocker arm should be in the horizontal position. If necessary, loosen the set screw and adjust tuner shaft so that rocker arm is horizontal with indicator set to channel 54. Do not adjust A31 unless oscillator calibration if off more than 3 channels. If necessary, adjust A31 for response similar to Fig. 7 with video marker at 50%. The image (weaker response) will appear also. The response toward the counter clockwise position of A31 is the correct response.
8.	"	"	"	"	"	"	A32, A33	Adjust for maximum amplitude and symmetry of response similar to Fig. 7.
9.	"	"	473MC (10MC Swp)	471.25MC	14	"		Check for response similar to Fig. 7. If oscillator is off more than 3 channels adjust the oscillator travel adjustment (osc. mixer and antenna travel adjustment are the 3 round thumb screws on top of tuner) to scale. Care must be used in making these adjustments so as not to move the rocker arm out of its bearing. Set the mixer and antenna travel adjustments for maximum response on scope.
10.	"	"	887MC (10MC Swp)	885.25MC	83		A34, A35, A36	Adjust A34 to place video marker at 50% on response curve as in Fig. 7. Adjust A35 and A36 for maximum amplitude and symmetrical response.

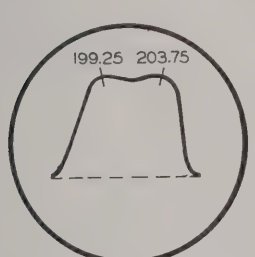


FIG. 6

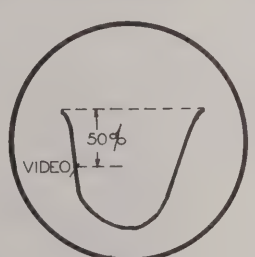


FIG. 7

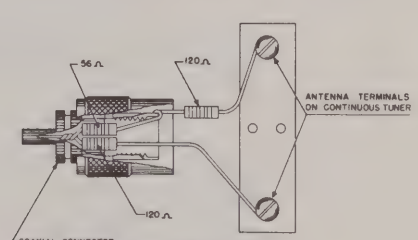


FIG. 8

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove Channel Selector and Off/On Volume Control knobs from top front of cabinet.
2. Remove 4 push-on type control knobs from under front control door.
3. Remove 8 wood screws. Remove rear cover.
4. Disconnect speaker leads, picture tube socket, H. V. lead, 3 tuner cables and yoke socket.
5. Disconnect ground leads between tuner and main chassis, and picture tube mount and chassis.
6. Remove 4 chassis bolts. Remove chassis.

TUNER REMOVAL

1. Disconnect cables between tuner and main chassis.
2. Remove 2 metal screws from the rear of the cabinet. Lower the rear of tuner and slide out.

VOLUME CONTROL ASSEMBLY REMOVAL

1. Remove 1 metal screw from escutcheon panel. Remove panel.
2. Remove 1 control nut (cabinet front).
3. Remove 1 metal screw from lead clamp (inside cabinet).
4. Remove lead clamp and volume control.

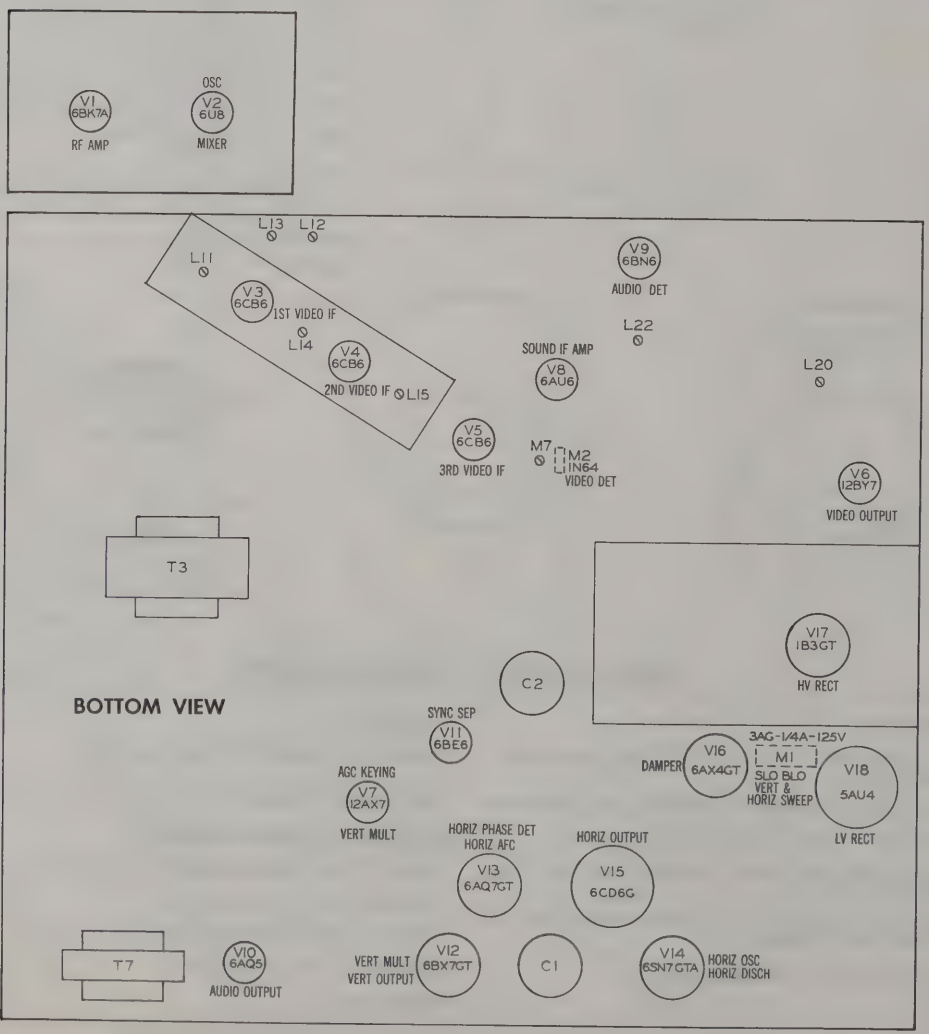
SPEAKER REMOVAL

1. Remove 4 speaker nuts. Remove speaker.

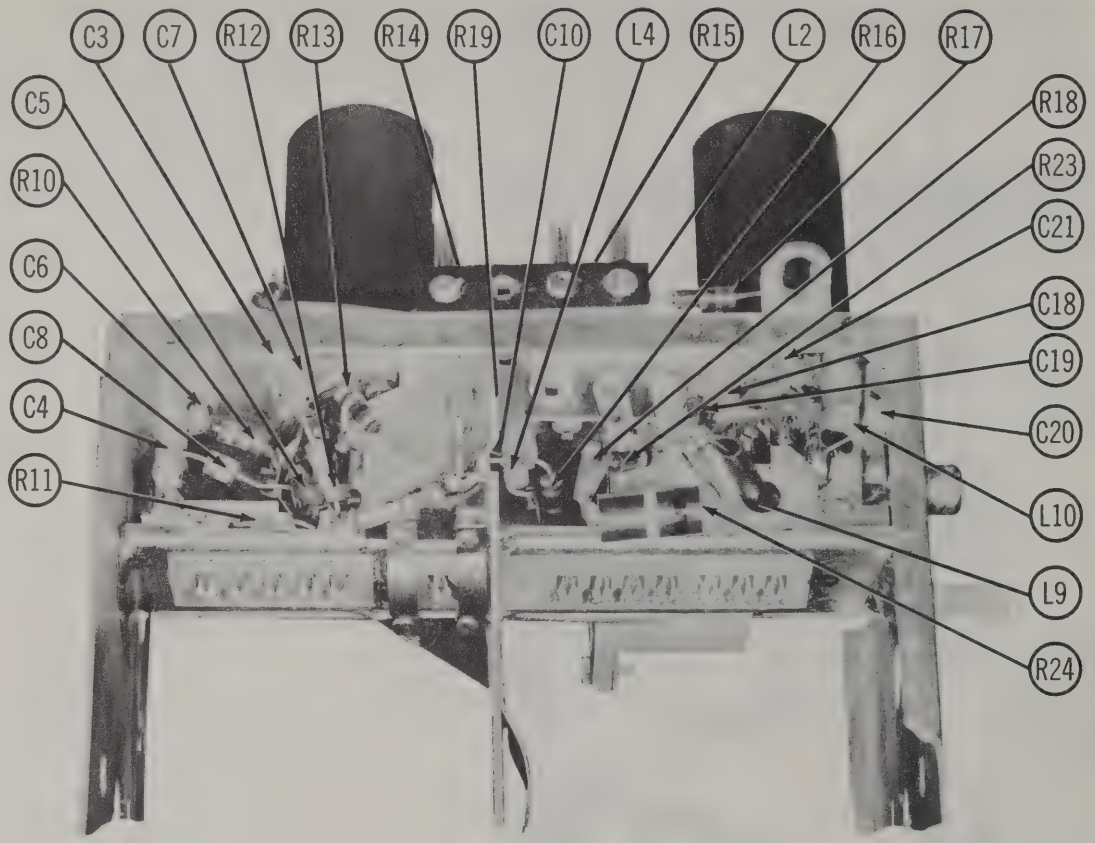
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BK7A	†800Ω	60KΩ	INF	0Ω	. 1Ω	INF	3. 5Meg	47Ω	0Ω
V 2	6U8	†10. 3KΩ	68KΩ	†100KΩ	. 1Ω	0Ω	†300Ω	0Ω	2. 2KΩ	12. 2KΩ
V 3	6CB6	1. 2Meg	500Ω	. 1Ω	0Ω	▲470Ω	▲470Ω	0Ω		
V 4	6CB6	70KΩ	▲15Ω	. 1Ω	0Ω	†600Ω	†600Ω	70KΩ		
V 5	6CB6	220Ω	340Ω	. 1Ω	0Ω	†5. 6KΩ	†5. 6KΩ	0Ω		
V 6	12BY7A	15Ω	2. 7KΩ	15Ω	0Ω	0Ω	. 1Ω	†5. 5KΩ	†22KΩ	15Ω
V 7	12AX7	680KΩ	3. 3KΩ	6. 5KΩ	. 1Ω	. 1Ω	◓4. 5Meg	200KΩ	50KΩ	0Ω
V 8	6AU6	100KΩ	0Ω	. 1Ω	0Ω	†32KΩ	†32KΩ	0Ω		
V 9	6BN6	450Ω	. 3Ω	. 1Ω	0Ω	†22KΩ	5. 5Ω	◓800KΩ		
V 10	6AQ5	300KΩ	680Ω	0Ω	. . 1Ω	†1. 3KΩ	†550Ω	300KΩ		
V 11	6BE6	18KΩ	0Ω	. 1Ω	0Ω	†110KΩ	1. 1KΩ	10Meg		
V 12	6BX7GT	1. 8Meg	†500Ω	1. 1KΩ	1. 8Meg	†500Ω	1. 1KΩ	. 1Ω	0Ω	
V 13	6AQ7GT	2Meg	1Meg	0Ω	3Meg	†47KΩ	470Ω	. 1Ω	0Ω	
V 14	6SN7GTA	47KΩ	◓220KΩ	0Ω	32KΩ	†79Ω	10KΩ	0Ω	. 1Ω	
V 15	6CD6G	TP	. 1Ω	0Ω	TP	680KΩ	NC	0Ω	†6KΩ	TOP CAP ◓7. 2Ω
V 16	6AX4GT	TP	NC	180KΩ	NC	†90Ω	TP	. 1Ω	0Ω	
V 17	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ◓277Ω
V 18	5AU4	TP	20KΩ	NC	15Ω	NC	14Ω	NC	20KΩ	
V 19	24CP4A	0Ω	47KΩ	PIN 10 ◓82KΩ	PIN 11 †250KΩ	PIN 12 . 1Ω				

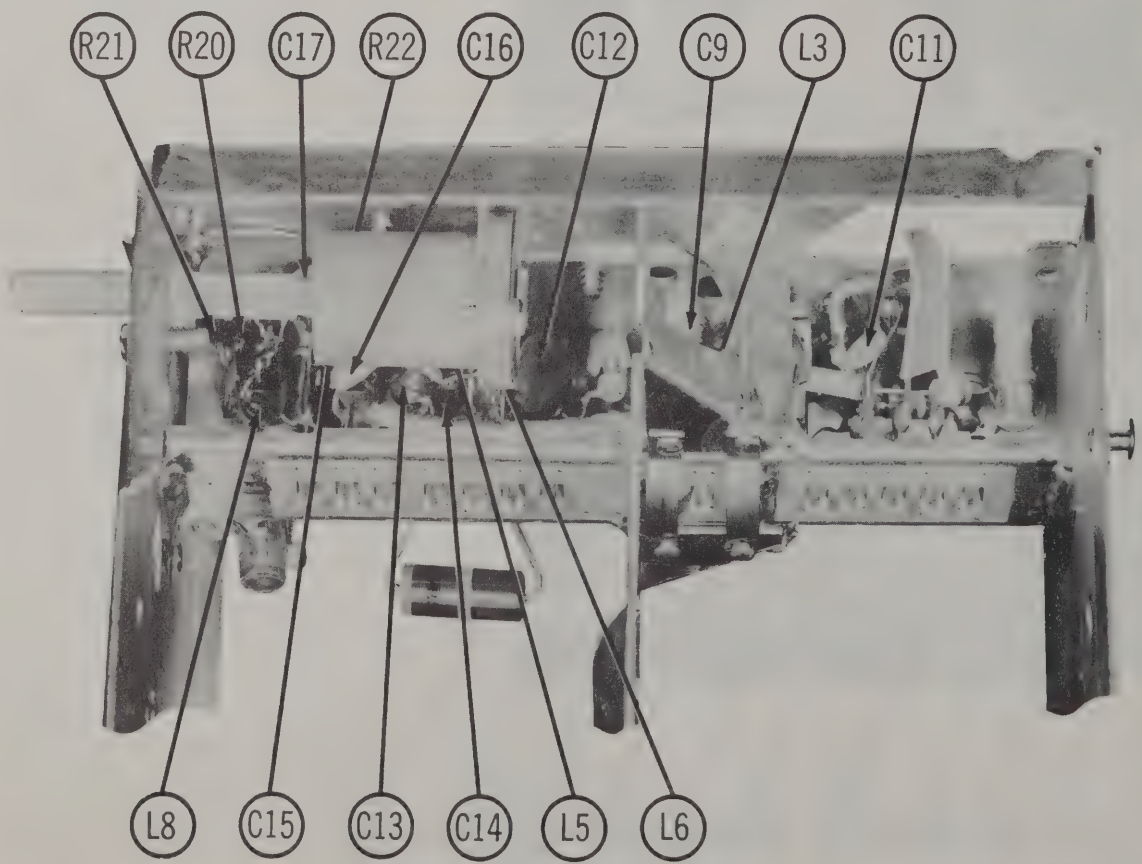
†MEASURED FROM PIN 2 OF V18.
▲MEASURED FROM PIN 7 OF V4.
◓MEASURED FROM PIN 3 OF V16.
TP-TIE POINT.
NC-NO CONNECTION.



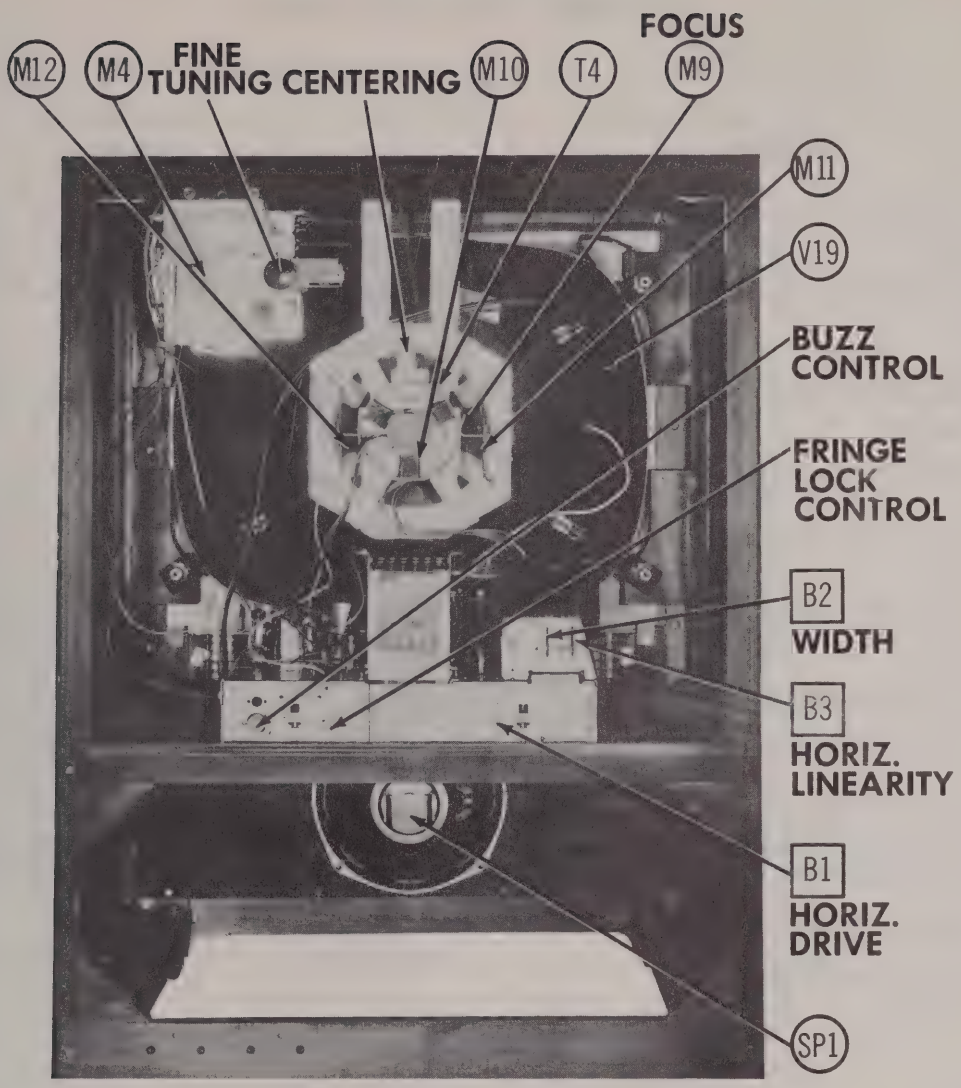
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



CABINET—REAR VIEW

PROPERTY OF
L. F. BLANKENSHIP
[illegible] MEADE ST.
DENVER, COLORADO

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on a TV station, preferably a test pattern.

Adjust the horizontal hold (L24) located on front of chassis until picture synchronizes horizontally.

Adjust the horizontal drive trimmer (B1) for greatest picture width.

Adjust the width slug (B2) for a picture slightly wider than necessary to fill the picture mask horizontally.

Adjust the horizontal linearity slug (B3) for a picture that is symmetrical from left to right.

AGC CONTROL ADJUSTMENT

Connect the vertical amplifier of an oscilloscope through a 10KΩ resistor to point Ⓐ. Low side to chassis. Select the strongest signal being received and adjust the AGC control (R4) for 2 volts peak to peak.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V15, V16, and V18. Check adjustments B1, B2 and B3. Check T2, T4A, R98, R99, C77, C78 and other associated components.

DRIVE LINES

Check by substitution V15 and V16. Check adjustments B1 and B3. Check C77, C78, R98, R99, T2, T4A and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V15 and V16. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V13, V14, V15 and V16. Check C71 for open. Check L24, C67, C70, R84, R83 and other associated components.

XMAS TREE EFFECT

Check by substitution V13, V14, V15 and V16. Check T2 and T4 for internal arcing. Check L24, C69, C68, C75, R89 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V7 and V12. Check waveform W10.

If Satisfactory	If Unsatisfactory
Check T3, T4B, C64, R77, R78, and other associated components.	Check C56, C61, C59, R2, R73 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V7 and V12. Check height and vertical linearity controls for proper operation. Check R94, T3 and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V7 and V12. Check R2, R78, C56, C61 and other associated components.

COMPRESSED AT TOP

Check by substitution V7 and V12. Check C2C, R6, R77, R78, T3, T4B and other associated components.

FOLDS

Check by substitution V7 and V12. Check C60, C57, C62, R69, R72, T3, T4B and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Substitute V11. Check C54, C55, R66, R67, R64 and other associated components.

LOSS OF VERTICAL SYNC- HORIZONTAL SYNC SATISFACTORY

Substitute V7. Check vertical integrator network. Check C56, C58, R73, R5 and other associated components.

LOSS OF HORIZONTAL SYNC- VERTICAL SYNC SATISFACTORY

Check by substitution V13 and V14. Check C66, C67, C73, C74, C71, R84, R83 and other associated components.

HORIZONTAL BENDING

Check by substitution V11, V13 and V14. Check horizontal AFC network.

VIDEO

LOSS OF VIDEO

Substitute V6. Check R43, R46, R40, C39, C41, C2A and other associated components.

SOUND BARS (4.5 MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A27. Check video IF alignment.

POOR CONTRAST

Substitute V6. Check L21, C41, R46, R43 and other associated components.

NEGATIVE PICTURE

Substitue V6. Check picture tube. Check video crystal detector network. Check C41 and other associated components.

SMEAR

Substitute V6. Check L17, L18, L19, L21, C41 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5 and V6 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V8, V9, and V10. Check stage V10 using audio signal generator. Apply audio signal across R1.

If Satisfactory	If Unsatisfactory
Check audio detector and Sound IF stages for component failure or change of value.	Check C50, C51, C52, C53, R58, R60, R62, R61, T7, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustments A30 and R98 for minimum buzz. If still unsatisfactory, check Sound IF alignment.

DISTORTED

Follow procedure outlined under "Weak or no Sound".

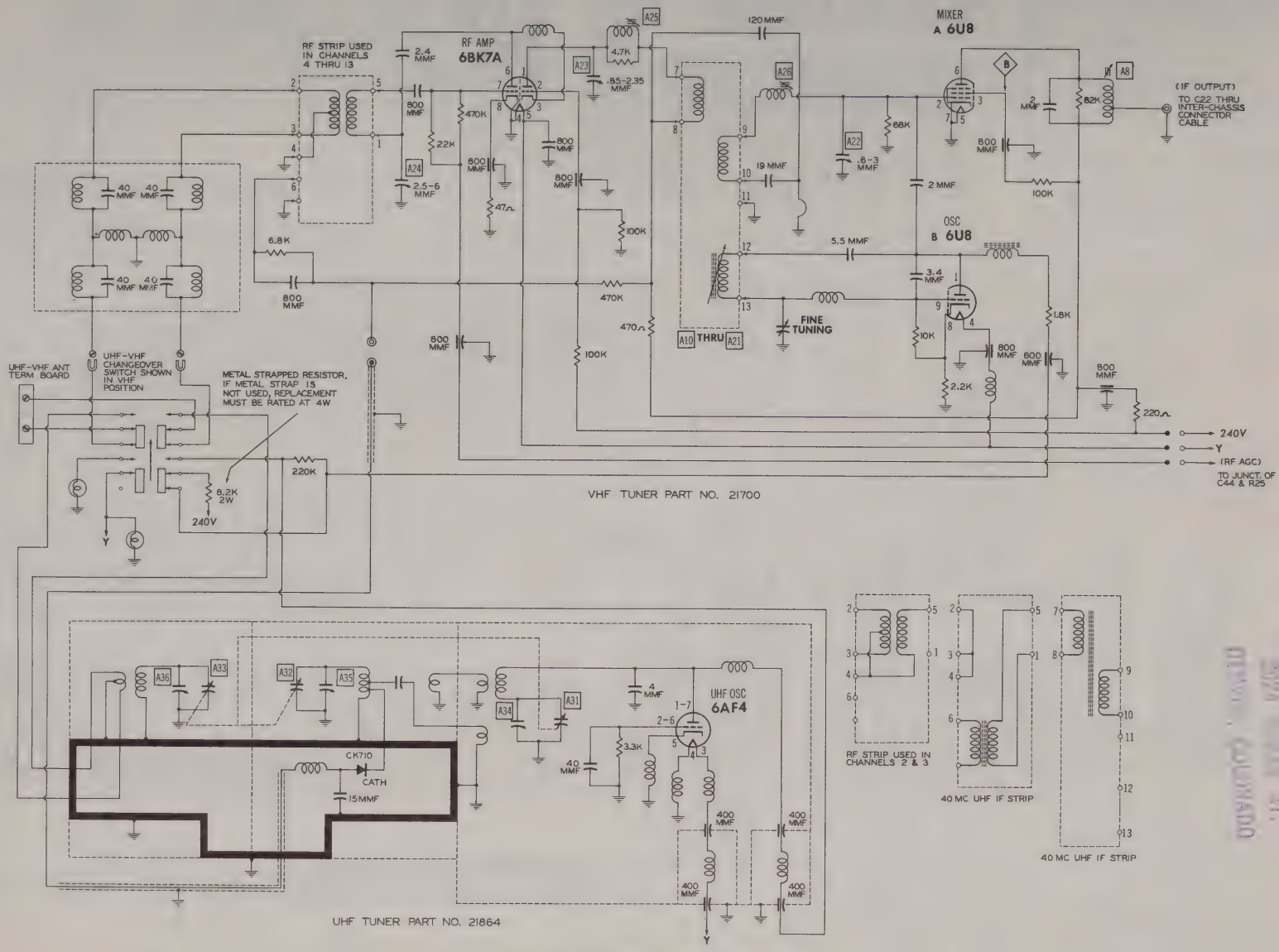
POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control and T1. If filaments light, substitute V18. Check B+ filter and decoupling network.

SMALL AND/ OR DIM PICTURE

Substitute V18. Check B+ filter and decoupling network.


RF STRIP USED IN CHANNELS 4 THRU 13
RF AMP 6BK7A
MIXER A 6U8
OSC B 6U8
(IF OUTPUT) TO C22 THRU INTER-CHASSIS CONNECTOR CABLE
A10 THRU A21
FINE TUNING
UHF-VHF ANT TERM BOARD
UHF-VHF CHANGEOVER SWITCH SHOWN IN VHF POSITION
METAL STRAPPED RESISTOR. IF METAL STRAP IS NOT USED, REPLACEMENT MUST BE RATED AT 4W
240V
Y
(RF AGC)
TO JUNCT. OF C44 & R25
VHF TUNER PART NO. 21700
UHF OSC 6AF4
CK710
CATH
UHF TUNER PART NO. 21864
RF STRIP USED IN CHANNELS 2 & 3
40 MC UHF IF STRIP
40 MC UHF IF STRIP

UHF-VHF TUNER PART NO. S21845 USED WITH MODELS T2670RU, AND TE670EU

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W Sams & Co, Inc 1955

PROPERTY OF
[illegible]
[illegible] ST.
DENVER, COLORADO

ALTERNATE UHF-VHF TUNER SCHEMATIC

T2670E, EU, R, RU (Ch. 19T23)

ZENITH MODELS

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amp.	6BK7A	6BK7A	9AJ	
V2	Mixer -Osc.	6U8	6U8	9AK	
V3	1st Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Output	12BY7A	12BY7A	9BF	12BY7 used as an alternate.
V7	AGC Keying-Vert. Mult.	12AX7	12AX7	9A	
V8	Sound IF Amp.	6AU8	6AU8	7BK	
V9	Audio Det.	6BN8	6BN6	7DF	
V10	Audio Output	6AQ5	6AQ5	7BZ	
V11	Sync Sep.	6BE6	6BE6	7CH	
V12	Vert. Mult. - Vert. Output	6BX7GT	6BX7GT	8BD	
V13	Horiz. Phase Det. - Horiz. AFC	6AQ7GT	6AQ7GT	8CK	
V14	Horiz. Osc. - Horiz. Discharge	6SN7GTA	6SN7GTA	8BD	6SN7GT used as an alternate.
V15	Horiz. Output	6CD6G	6CD6G	8DT	
V16	Damper	6AX4GT	6AX4GT	4CG	
V17	HV Rect.	1B3GT	1B3GT	3C	
V18	LV Rect.	5AU4	5AU4	5T	

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: ZENITH PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V19	24CP4A ①	24TP4/ 24CP4A ①	24TP4/24CP4A ①	24CP4A ③ 24CP4	24CP4A ① 24CP4	12N 12M	① Aluminized ② Silver Screen

ELECTROLYTIC CAPACITORS

ITEM No	RATING: CAP	VOLT	REPLACEMENT DATA: ZENITH PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	NOTES
C1A	≡40	400	22-3547	FP378	TM-804020-	Z-180	
B	20	400		FC26	460	FM-0225	
C	≡10	400			TD-25-25		
D	20	25					
C2A	≡4	350	22-3546	FP387.1	TM-3061	Z-810	
B	≡10	475					
C	100	50					

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. Mica and Ceramic Capacitors.

ITEM No	RATING: CAP	VOLT	REPLACEMENT DATA: ZENITH PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	NOTES
C3	500		22-2577				
C4	2.5-8		22-2231	829-5			
C5	600		22-2331	DD-501	831-501	DC-531	
C6	800		22-2577				
C7	800		22-2577				
C8	2-4		22-2596				
C9	800		22-2577				
C10	4.5-2.5		22-2453	829-3	3125-01-GR5	CT565A	
C11	900		22-2331	DD-501	831-501	DC-531	
C12	120		22-2591	DD-121	831-121	UC-5312	
C13	19		22-2406				
C14	.6-3		22-2504	829-3	3125-01-GR5	CT565A	
C15	2		22-2434				
C16	5.6		22-2499				
C17	3.4		22-2582				
C18	800		22-2577				
C19	800		22-2577				
C20	2		22-2585				
C21	800		22-2577				
C22	470		22-2302	DD-471	831-470	UC-5347	
C23	8		22-2481				
C24	17		22-2594				
C25	30		22-2550	TCZ-30	NPOL-300		
C26	24		22-2515	TCZ-24	NPOL-240		
C27	45		22-2600				
C28	15	200	22-2147			PT4015	
C29	330		22-2309	D6-331	GPZK-331	UC-5333	
C30	470		22-2302	D6-471	GPZK-471	UC-5347	Note 1
C31	1000		22-?	DD-102	831-501	DC-521	
C32	470		22-2302	D6-471	GPZK-471	UC-5347	
C33	1000		22-?	DD-102	831-501	DC-521	
C34	1000		22-2112	D6-102	GPZL-102	UC-521	
C35	470	500	22-2134	D6-471	GPZK-471	MC245	
C36	470		22-2217	D6-471	GPZK-471	UC-5347	
C37	4.5		22-2322				
C38	?		22-2375	TCZ-6R8	NPOA-6R8	ZT-5568	
C39	.022	200	22-2071	DF-303	817-03	PT4122	
C40	47		22-2467	TCH-47	NT03K-470	NT-5447	
C41	.1	200	22-1777	DF-104		PT401	
C42	10000		22-2	DD-103	811-01	DC-511	
C43A	1000		22-2545	DD3-102	813-001	DCD-521	
B	1000						
C44	10000		22-3	DD-103	811-01	DC-511	
C45	3.3		22-2348	TCZ-3R3	NPOA-3R3	ZT-5533	
C46	50		22-2480	D6-500	GPZK-500	UC-548	
C47A	1000		22-2553	DD3-102	813-001	DCD-521	
B	1000						
C48	10000		22-3	DD-103	811-01	DC-511	
C49	10		22-2378				
C50	10000		22-3	DD-103	811-01	DC-511	
C51	470		22-2302	D6-471	831-471	UC-5347	
C52	100		22-5	DD-101	831-101	UC-531	
C53	2200		22-4	D6-223	811-0033	UC-5323	
C54	3300		22-11	D6-332	811-0033	UC-5333	
C55	27		22-2396	TCZ-27	NPOL-270		
C56	.0022	400	22-1803	D6-222	GPZ-333-222	PT6222	
C57	.0022	400	22-2181			MCB460	
C58	033	200	22-2510				
C59	.33	300	22-2156				
C60	.022	400	22-2072	DF-303	817-03	PT4122	
C61	.1	400	22-2005	DF-104		PT401	
C62	.001	800	22-2138		811-103	MCB355	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No	RATING: CAP	VOLT	REPLACEMENT DATA: ZENITH PART No.	CENTRALAB PART No.	ERIE PART No.	MALLORY PART No.	NOTES
C63	.001	600	22-2138		811-103	MCB255	
C64	.33	300	22-2187			PT4032	
C65	.022	400	22-2072	DF-303	817-03	PT4122	
C66	100	500	22-1442	D6-101	801-101	MCB235	
C67	150	500	22-1197	D6-151	811-151	MCB236	
C68	.001	200	22-1839	D6-102	GP2L-102	PT621	
C69	.0047	200	22-1842			MCB465	
C70	.15	400	22-2166			PT4015	
C71	.001	400	22-1839	D6-102	GP2L-102	PT621	
C72	.1	200	22-1777	DF-104		PT401	
C73	680	500	22-2125	D6-681	811-681		
C74	.0015	400	22-1785	D6-152	GP2L-152		
C75	1000	500	22-2153		811-103	MCB255	
C76	1000		22-2598	DD-102	801-101	DC-521	
C77	680		22-2387	D6-681	811-681		
C78	330		22-2309	D6-331	811-331		
C79	.0022	400	22-1803	D6-222	GP3-333-222	PT6222	
C80	.15	400	22-2341			PT4015	
C81	.1	400	22-2340	DF-104		PT401	
C82	90	4000	22-2462				
C83	75	3000	22-2698	DD30-750			
C84	.1	600	22-1841	DF-104		PT601	
C85	72	2000					

Note L Some versions use 1000MMF in this application (Part No. 22-?).

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	63-3257	Q11-157	A47-1Meg-S	AB-897	U-53	Volume
B	Shaft		Not Req.	Not Req.	FS-3	AK-3	Not Req.	Attach to R1A.
C	Switch		Not Req.	78-1	SWE-12	KB-1	U3-56	Attach to R1A.
D	Cover		Not Req.			KB-1		Attach to RIC.
R1A	1Meg	½	63-3229	Q13-137	A47-1Meg-Z	B-70-S	U-53	Volume-See Note l
B	Shaft		Not Req.	Not Req.	FZ-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	78-1	SWE-13	Not Req.	U3-56	Attach to R1A.
D	Cover		Not Req.			KB-5		Attach to RIC.
R2A	5.5Meg	½	63-3246	Q11-142+	A47-2.5Meg-S+	AB-899	U-52+	Height (Stop at 7.5Meg)
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R2A.
R3A	300KΩ	½	63-3237	Q11-139	A47-300K-S	AB-45	U-43	Brightness
B	Shaft		Not Req.	RQ	KSS-3	AK-4	Not Req.	Attach to R3A.
R4A	15KΩ	½	63-3278	Q11-119	A47-16K-S	AB-30	TA1531	AGC
B	Shaft		Not Req.	RQ	FKS-1/4	AK-1	Not Req.	Attach to R4A.
R5A	75KΩ	½	63-3222	Q11-125	A47-75K-S	AB-35	U-41	Vertical Hold
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R5A.
R6A	1500Ω	½	63-3232	Q11-109	A47-1500-S	AB-3	TA-1531	Vertical Linearity
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R6A.
R7A	5000Ω	4	63-3201		A10-5000	SVP-099	MSM25	Contrast
B	Shaft		Not Req.		RS-2	Not Req.	Not Req.	Attach to R7A.
R9	650Ω	2	63-3167		39-650†			Buzz (Fixed MINIMUM 100Ω)
R8	750Ω	2	63-3284		39-900			Buzz-See note l.
R6A	5Meg	½	63-3208	Q11-141	A47-5Meg-S	AB-87	TA56L	Fringe Lock
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R6A.

Note L Used as an alternate in some versions.
* Connect a 1Meg resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (Control viewed from the shaft end, terminals down).
† Connect a 100Ω resistor in series with the terminal of the control and the lead connecting to the same terminal of the original control.

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: ZENITH PART No.	IRC PART No.	NOTES
R10	22KΩ	½	63-1841		
R11	47KΩ	½	63-1856	BTS-47K	
R12	470KΩ	½	63-1977	BTS-470K	
R13	47Ω	½	63-1729	BTS-47	
R14	100KΩ	½	63-1869		
R15	100KΩ	½	63-1869		
R16	4700Ω	½	63-1813	BTS-4700	
R17	330Ω	½	63-1768	BTS-330	
R18	470Ω	½	63-1772	BTS-470	
R19	22KΩ	½	63-1842		
R20	100Ω	½	63-1858		
R21	2200Ω	½	63-1800		
R22	68KΩ	½	63-1862	BTS-68K	
R23	100KΩ	½	63-1869		
R24	10KΩ	2	63-3170		
R25	2.5Meg	½	63-1938	BTS-2.5Meg	
R26	56Ω	½	63-1737	BTS-56	
R27	470Ω	½	63-1772	BTS-470	
R28	56Ω	½	63-1753	BTS-56	
R29	180Ω	½	63-1754	BTS-180	
R30	2.7KΩ	½	63-1845		
R31	120KΩ	½	63-1873	BTS-120K	
R32	470Ω	½	63-1772	BTS-470	
R33	120KΩ	½	63-1873	BTS-120K	
R34	15KΩ	½			Note 1
R35	1KΩ	½	63-1708	BTS-1K	
R36	5900Ω	½	63-1821		
R37	5600Ω	2	63-3223		
R38	120Ω	½	63-1747	BTS-120	
R39	220Ω 5%	½	63-1756	BTS-220 5%	
R40	22KΩ	2	63-1586	BTS-22K	
R41	33KΩ	½	63-1848	BTS-33K	
R42	47KΩ	½	63-1855	BTS-47K	
R43	1KΩ	½	63-1708	BTS-1K	
R44	47KΩ	½	63-1855		
R45	220KΩ	½	63-1884		
R46	680Ω	1	63-2390		
R47	220KΩ	½	63-1884		
R48	100KΩ	½	63-1870		
R49	82KΩ	½	63-1886		
R50	330Ω	½	63-1806		
R51	680KΩ	½	63-1904		
R52	220KΩ	½	63-1884		
R53	330KΩ	½	63-1884		
R54	180KΩ	1	63-2313		
R55	100KΩ	½	63-1870	BTS-100K	
R56	10KΩ	½	63-1837	BTS-10K	
R57	22KΩ	2	63-2141	BTB-22K	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: ZENITH PART No.	IRC PART No.	NOTES
R58	680Ω	½	63-1779	BTS-680	
R59	1000Ω	½	63-1786	BTS-1000	
R60	680KΩ	½	63-1904	BTS-680K	
R61	47KΩ	½	63-1771	BTS-470	
R62	680Ω	1	63-2390	BTA-680	
R63	15KΩ	½	63-1834		
R64	470KΩ	½	63-1897		
R65	10MΩ	½	63-1953		
R66	470KΩ	½	63-1897		
R67	100KΩ	½	63-1869		
R68	56KΩ	½	63-1859		
R69	22KΩ	½	63-1841		
R70	150KΩ	½	63-1875		
R71	100KΩ	½	63-1869		
R72	47KΩ	½	63-1855	BTS-47K	
R73	10KΩ	½	63-1838	BTS-10K	
R74	100Ω	½	63-1744		
R75	1.5Meg	½	63-1922		
R76	100Ω	½	63-1744		
R77	470Ω	½	63-3187		
R78	330Ω	½	63-1768	BTS-330	
R79	560Ω	½	63-1775		
R80	560Ω	½	63-1775		
R81	1Meg	½	63-1911		
R82	1Meg	½	63-1911		
R83	1Meg	½	63-1911		
R84	27KΩ	½	63-1845	BTS-27K	
R85	100Ω	½	63-1744		
R86	47KΩ	1	63-1854	BTA-47K	
R87	470Ω	½	63-1771		
R88	10KΩ	2	63-2145		
R89	22KΩ	1	63-859	BTA-22K	
R90	22KΩ	½	63-1842		
R91	47KΩ	½	63-1856		
R92	120KΩ	½	63-1873	BTS-120K	
R93	220KΩ	1	63-3194	BTA-220K	
R94	82KΩ	½	63-1971		
R95	100Ω	½	63-1744		
R96	680KΩ	½	63-1905		
R97	100Ω	½	63-1744		
R98	12KΩ	2	63-1623		
R99	12KΩ	2	63-1623		
R100	22KΩ	1	63-1055		
R101	10KΩ	2	63-2145		
R102	470ΩΩ	½	63-1814	BTS-4700	
R103	5.6Ω	½	63-3253	BW½-5.6	
R104	22KΩ	½	63-1842		
R105	100KΩ	½	63-1870	BTS-100K	

Note L Some versions use a 10KΩ ½W resistor in this application. (Part #63-1827).

TRANSFORMER (POWER)

ITEM No	RATING: PRI	SEC 1	SEC 2	SEC 3	SEC 4	SEC 5	REPLACEMENT DATA: ZENITH PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ 1.9A	540VCT @ 230ADC	5VAC @ 3A	12.6VCT @ 5.1A			95-1434						

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA: ZENITH PART No.	Halldorson PART No.	Merit PART No.	B&W TYPE No.	Rim PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Horiz. Output Trans.	S-32720 ①							
T3	Vert. Output Trans.	95-1426						A-8146	
T4A	Yoke (90°)Horiz.&3MHz Vert. (42MB)	95-1432			DF606 ②	MDF-912	237DH ②	DY-13A ②	Y-14 ②
B									Y-40-1 ②
T5	Horiz. Lin. Coil (L 5 to 3 MH)	S-19342			RF800 ③ ⑦	MWC-3 ③	307BH ③ ⑦	307H3A ④	WC-7 ⑦
T6A	Width-Series Coil (.4-2.4MH)	S-18749							WC-23 ⑦
B	Width-Parallel Coil (3.8-23MH)								WC-24

① Complete assembly includes: winding & term. assembly; Zenith Part No. S-22719
tertiary winding & term. assembly Zenith Part No. S-21364.
② Use original horiz. yoke damping network.
③ Use original slider.
④ Drill new mounting hole.
⑤ Do not use tap.
⑥ Connect to coded blue & green terminals.
⑦ Connect to terms #3 or #4 & "C".

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE: PRI	SEC	REPLACEMENT DATA: ZENITH PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T7	9.4KΩ	3.6Ω	95-1379	Z1117	A-2932	A-3879	24S50	S-51X	

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V C IMP.	REPLACEMENT DATA: ZENITH PART No.	OUAM PART No.	NOTES
SP1	10"	PM	3.6Ω	49-752	10A31	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Coils	00CT	0Ω					
L2	Fil. Choke	0Ω		20-291				
L3	Neut. Coil	0Ω		20-431				
L4	RF Coil	0Ω		20-537				Channel 13
L5	Mixer Grid Coil	0Ω		20-536				Channel 13
L6	RF Choke	0Ω		126-764				
L7	RF, Mixer Grid Osc. Coils	0Ω						
L8	Osc.Coupling	0Ω		20-541				
L9	RF Coil	0Ω		5-16859				
L10	Conv. Plate	7.5Ω		5-20303				Tapped ① 1.5Ω.
L11	1st Video IF	.1Ω		5-21019			6323	Includes 41.25MC Trap.
L12	41.25MC Trap	0Ω		5-21718	17-4503*		6226	
L13	39.75MC Trap	0Ω		5-21719	17-4501*		6226	
L14	2nd Video IF	.1Ω	.1Ω	5-17907			6232*	
L15	3rd Video IF	.1Ω	.1Ω	5-19952			6233*	
L16	4th Video IF	.3Ω	.3Ω	5-20623				
L17	Series Peaking Coil	6Ω		5-17913	19-3093	TV-1S1	6177	95 Microhenries
L18	Shunt Peaking Coil	5.6Ω		5-21562	19-3160 ▲	TV-1S4 ▲	6044 ▲	180 Microhenries, Wound in series on 2.7KΩ resistor.
L19	Series Peaking Coil	1Ω		5-21688	19-1004		6510	
L20A	4.5MC Trap	1Ω		5-21492				
B	1st Sound IF	1.4Ω						
L21	Series Peaking Coil	5.5Ω		5-21563	19-3125 ▲		6153 ▲	136 Microhenries, Wound on 5.6KΩ resistor.
L22	2nd Sound IF	.3Ω	.3Ω	5-20219	18-3445			
L23	Quadrature Coil	5.5Ω		5-19030	30-1004 ▲	TV-1S1 ▲	1480 ▲	
L24	Horiz. Osc.	185Ω		5-19743	19-1577			Tapped ② 65Ω.
L25	Spook Coil	.2Ω		30-538				5.5 Microhenries
L26	RF Choke	9Ω		5-22177	19-1005		6613	10 Microhenries

▲ Use trap winding only.
◆ Detune trap.
▲ Series with 2.7KΩ resistor.
▲ Parallel with 5.6KΩ resistor.
◆ Drill mounting hole.

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	D C RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: ZENITH PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L27	230ADC	79Ω	2.7HY	95-1348	C9037 ①	C-2296 ①	C-3326 ①	30C55 ①	C-17X

① Drill one new mounting hole.

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

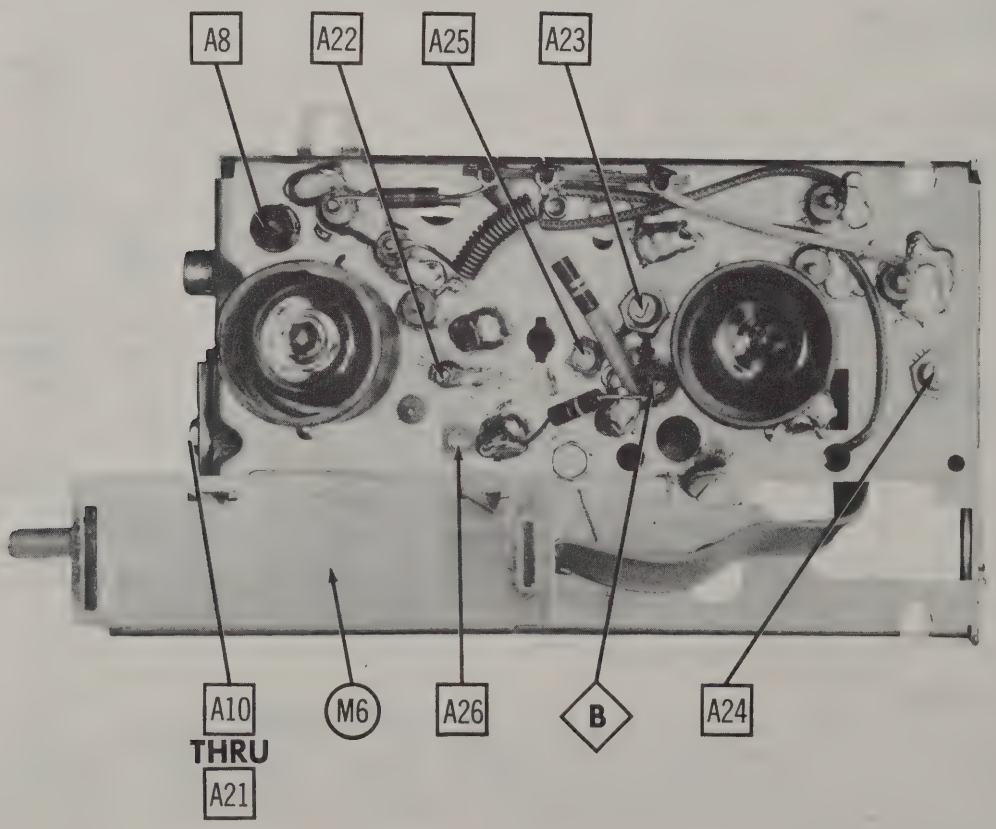
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			ZENITH PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	1/4A 125V	136-22	83-1883	313. 250 (3AG S/B 1/4A)	357001	MDL 1/4	4405

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		ZENITH PART No.	SYLVANIA PART No.	
M2	1N64	103-1	1N60 or 1N132	Video Det.

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
M3	Dial Light	100-66	#PR 12
M4	Tuner	S21735	VHF-UHF-Models T2670R, T2670E
	Tuner	S21700	VHF-Models T2670RU, T2670EU
M5	Tuner	S21864	UHF-Models T2670RU, T2670EU
M6	Trap		VHF-Ant. Input Filter
M7	Video Det. Assy.	S-21686	Includes M2, L16, L17, L18, C37, C38
M8	Integrator	87-1	Vertical
M9	Focus Magnet	S-20344	Includes Centering Device-Alternate Part #S-22252
M10	Ion Trap	S-17461	
M11	Correction Magnet	S-20360	
M12	Correction Magnet	S-20360	
B1	Trimmer Cap.	22-2398	Horiz. Drive (15-125MMF)
	Cabinet	14-1839E	Models T2670E, EU
	Cabinet	14-1839R	Models T2670R, RU
	Knob	S-21883	Channel Selector
	Knob	S-22408	Fine Tuning
	Knob	46-1118	Horiz. Hold
	Knob	46-1182	Vert. Hold & Brightness
	Knob	46-1199	Contrast
	Knob	46-1335	On-Off-Volume
	Safety Glass	192-192	
	Mask	196-254	



RF TUNER TOP VIEW

TROUBLE SHOOTING AIDS (cont)

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V13, V14, V15, V16 and V17. Check fuse, M1. Check waveform W18.

If Satisfactory	If Unsatisfactory
Check T2, T4A, T5, T6, C79, C80, C81, C82, C83, C84, R98, R99, R103, and other associated components.	Check L24, C73, C74, C76, C75, C78, R86, R88, R93 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V15, V16, and V18. Check adjustments B1, B2 and B3. Check R98, R99, R100, R101, R103, R104, C77, C78 and other associated components.

BLOOMING

Check by substitution V15, V16, V17 and V18. Check R98, R99, R103, R104, C78, C84 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or no Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5 and V6. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

KEYSTONE EFFECT

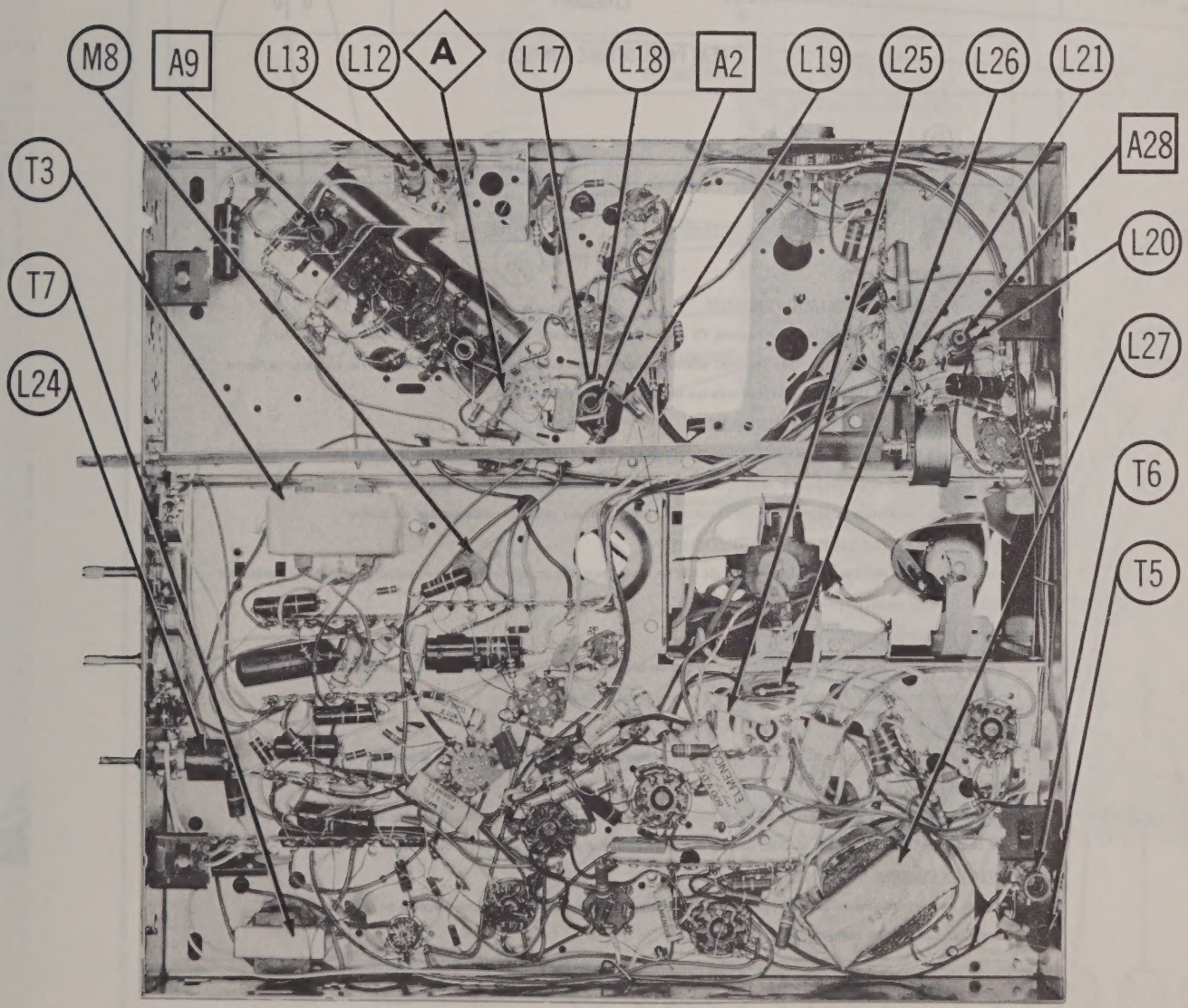
Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of the VHF tuner oscillator circuit, it is necessary to remove rear cover and supply power to set. Adjustments are made thru the hole marked "Bull's Eye Adjustment" and are accessible one at a time as the selector switch is turned to each channel. (Fine tuning control must be set to the center of its range before making adjustments). Use Zenith alignment wrench part #68-21 for adjustment).

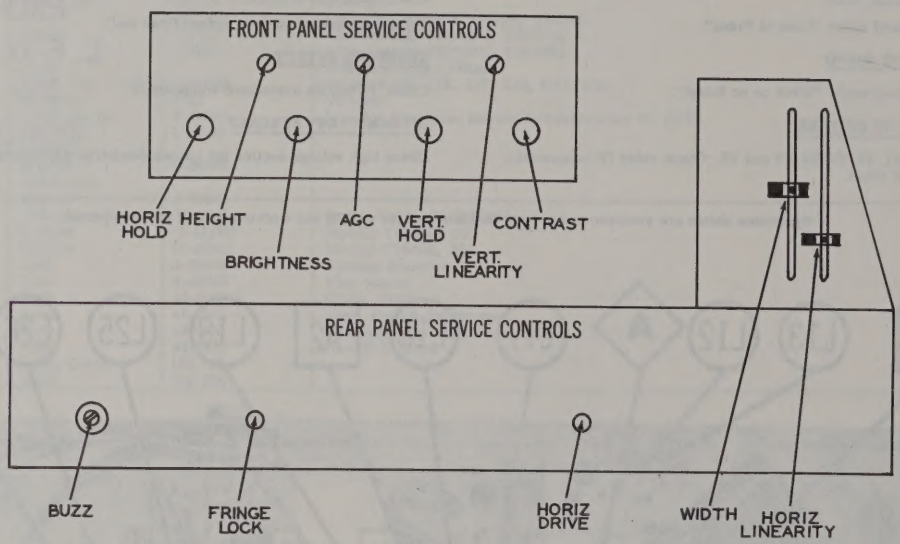
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 2 push-on type control knobs (channel selector and on-off volume). Remove 2 metal screws from each knob escutcheon panels. Remove escutcheons . Let safety glass fall forward and lift out of slot at the bottom. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



SPECIAL ADJUSTMENTS

AGC CONTROL FIELD ADJUSTMENT

Turn set on and tune in the strongest TV signal in that area and observe the picture. Starting from the full clockwise position, turn the AGC control counter clockwise slowly until picture distorts and buzz is heard in the sound, then turn control clockwise for best picture and sound.

FRINGE LOCK CONTROL ADJUSTMENT

Turn the fringe lock control 1/4" turn from full clockwise position. Adjust the vertical and horizontal hold for picture synchronization and check stability by switch off channel and back again. Slightly retouch the fringe lock control adjustment, if necessary, for maximum stability while testing as above.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the front panel service control. Adjust the horizontal hold (L24) until picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

Adjust the buzz control (R8) located on the rear apron of the chassis for maximum volume and minimum buzz. If results are unsatisfactory, see alignment of "Sound IF Alignment".

FUSES

One fuse is used for Horiz. & Vert. Sweep Circuit protection. (For location see Tube Placement Chart.)

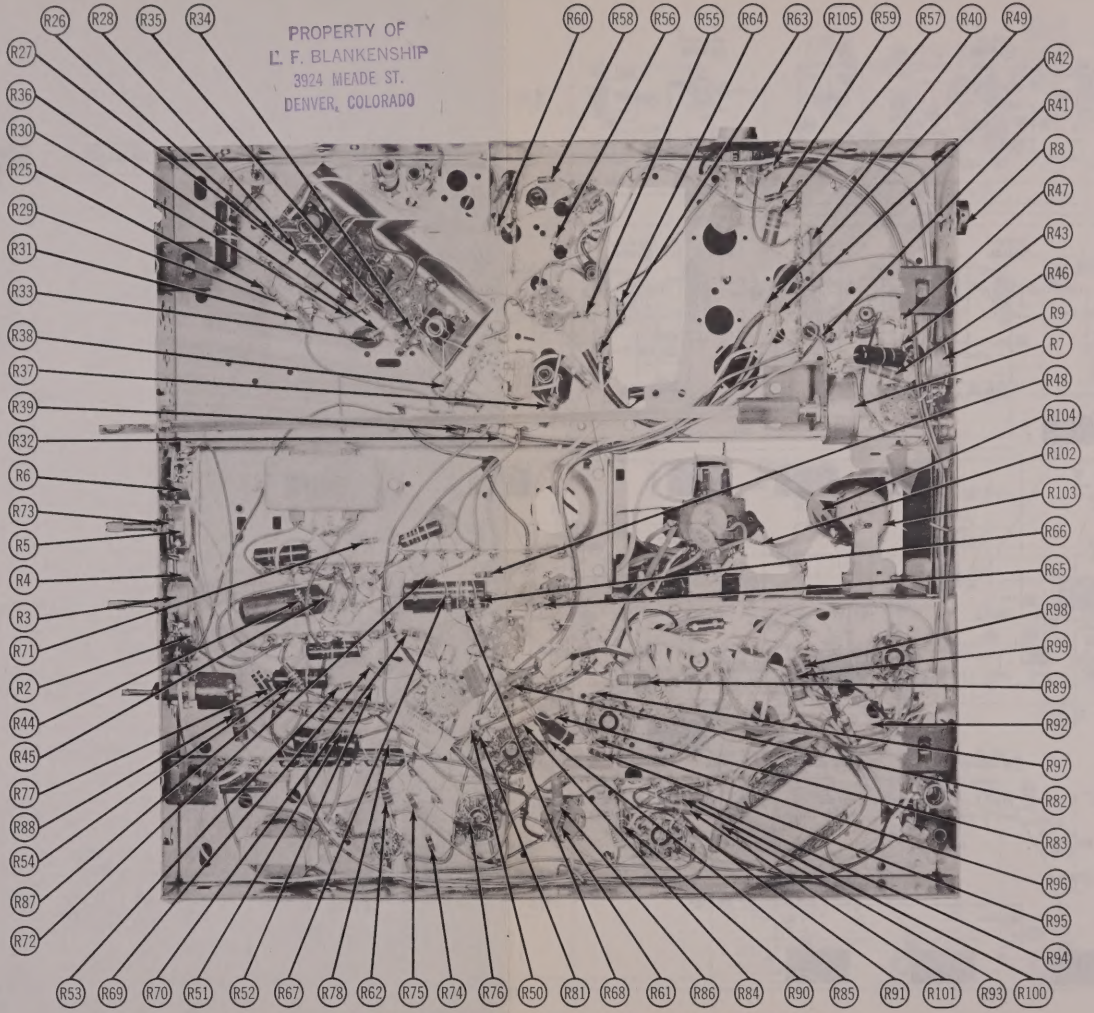
CENTERING

Centering is accomplished mechanically by means of a centering lever on the P. M. Focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

ANTI-PIN CUSHION ADJUSTMENT

Reduce the picture size so that the sides of the raster are visible, and position the magnets so that all sides are straight lines and the corners are at right angles.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION